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Future of International Cooperation Report 2024

The Innovation Imperative: Tech-Governance, Development & Security at a Crossroads

Global Governance Innovation Network

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Future of International Cooperation Report 2024

The Innovation Imperative: Tech-Governance, Development & Security at a Crossroads

> **By offering concrete proposals for innovating global and regional governance at the intersection of technology, sustainable development, and peace and security, this report gives Doha Forum participants and concerned citizens and governments worldwide the tools to chart a course toward a safer, more just, and more prosperous future for all.**

What new institutions and practices—engaging government as well as civil society, religious, and business leaders—are required to keep pace with and to harness technology's full potential for the benefit of humanity? This second edition of the *Future of International Cooperation* (FIC'24) focuses on how technology and its governance can best advance and safeguard fundamental global development and security goals, including the 2030 Agenda for Sustainable Development and the quest for sustainable peace. With a fresh analytical lens and foundational principles for effective global and regional approaches to tech-governance, the report assesses both the risks and promise of tech-governance innovations for global development in the AI/cybertech, biotech, and greentech spaces, and for global peace and security in the domains of AI/cybertech, weapons of mass destruction, and essential minerals supply chains for advanced military and civilian technologies. By offering novel ways to manage and employ technology as a force for good, FIC'24 identifies entry points for deepening the multiple, mutually reinforcing ways this year's Summit of the Future has positively influenced last year's SDG Summit and will likely shape next year's World Social Summit in Doha.

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Foreword

Just as international cooperation takes many forms and plays itself out in various transnational forums and relationships, so too does innovation. Arguably, the need for countries and their citizens to innovate has never been greater, as disruptive global forces, fueled by cutting-edge technologies, operate at breakneck speeds in socioeconomic, security, environmental, and other spaces. Given these, simultaneously, threatening *and* promising trends, the current three-part series of diplomatic high-stakes global gatherings—namely, last year's SDG Summit, this year's Summit of the Future, and next year's World Social Summit—are both timely and critical. Whether rich or poor, big or small, when nations innovate together, their citizens are better equipped to harness the benefits of technology and live in ever more interconnected ways across borders.

In preparation for this year's Doha Forum on December 7th and 8th, the *Future of International Cooperation Report 2024* seeks to better inform forum participants, policy-makers, and concerned citizens, by addressing vital dimensions of global and regional cooperation in order to meet major challenges, risks, and opportunities of the present era. Under the theme "The Innovation Imperative: Tech-Governance, Development & Security at a Crossroads," the report offers a fresh analytical lens and new principles, giving special attention to the shift toward more open, collaborative, and cross-sectoral models of innovation. In doing so, it aspires to help participants of the 2024 Doha Forum to apply the principles of innovation to the most pressing issues facing our planet—addressing both challenges and opportunities at the intersection of geopolitics, economic development, emerging technologies, security, and culture—through diplomacy, dialogue, and diversity.

We wish to express our appreciation to the authors of this report, which represents the latest intellectual collaboration between the Doha Forum, the Stimson Center, and the Global Institute for Strategic Research (based at the Qatar Foundation's Hamad Bin Khalifa University). We hope it will inform a rich and open exchange at the upcoming Doha Forum and other international dialogues dedicated to promoting a safer, more just, and more prosperous future for all. By rethinking the future of international cooperation and innovation, and how these two forces interrelate through myriad institutions and public-private partnerships (*often facilitated by creative new approaches to global and regional governance*), we can chart a more fulfilling and hopeful path for current and future generations.

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List of Abbreviations

AI ..... Artificial Intelligence
AI/ML ..... Artificial Intelligence/Machine Learning
ASEAN ..... Association of Southeast Asian Nations
AU ..... African Union
BRICS ..... Brazil, Russia, India, China, and South Africa
CBRN ..... (EU's) Chemical, Biological, Radiological, and Nuclear
BWC ..... Biological Weapons Convention
CCW ..... Convention on Certain Conventional Weapons
COP29 ..... 29th session of the Conference of the Parties to the UN Framework Convention on Climate Change
CSR ..... Corporate Social Responsibility
CTBT ..... Comprehensive Nuclear-Test-Ban Treaty
CTCN ..... UN Climate Technology Center and Network
CWC ..... Chemical Weapons Convention
DEW ..... Directed Energy Weapons
DPI ..... Digital Public Infrastructure
EU ..... European Union
FIC'23 ..... *Future of International Cooperation Report 2023*
FIC'24 ..... *Future of International Cooperation Report 2024*
G7 ..... Group of Seven countries
GCF ..... Green Climate Fund
GDC ..... Global Digital Compact
GtLF ..... Greentech Licensing Facility
HLAB ..... (UN) High-Level Advisory Board on Effective Multilateralism
HRBA ..... Human Rights-based Approaches
IAEA ..... International Atomic Energy Agency
IA2 ..... International Artificial Intelligence Agency
ICT ..... Information and Communication Technology
IHL ..... International Humanitarian Law
INB ..... Intergovernmental Negotiating Body
IP ..... Intellectual Property
IPR ..... Intellectual Property Rights
IPCC ..... Intergovernmental Panel on Climate Change
IISPAI ..... Independent International Scientific Panel on AI
ISR ..... Intelligence, Surveillance, and Reconnaissance
ISU ..... Implementation Support Unit
iSDG ..... integrated Sustainable Development Goal
ITU ..... International Telecommunication Union
LAWS ..... Lethal Autonomous Weapon Systems
LLMs ..... Large Language Models
MATCH ..... Stimson Center's Monitoring and Tracking Chemicals Project
ML ..... Machine Learning
MMP ..... Military Mineral Practices
MONUSCO ... United Nations Organization Stabilization Mission in the Democratic Republic of the Congo
NGOs ..... Non-Governmental Organizations
OECD ..... Organisation for Economic Cooperation and Development
OPCW ..... Organization for the Prohibition of Chemical Weapons
OSET ..... United Nations Secretary-General's Envoy on Technology
REEs ..... Rare Earth Elements
R2Pre ..... Responsibility to Prevent
SAARC ..... South Asian Association for Regional Cooperation
SALW ..... Small Arms and Light Weapons
SDG(s) ..... Sustainable Development Goal(s)
SG ..... (UN) Secretary-General
SOTF ..... Summit of the Future
SSI ..... Safety, Sustainability, and Inclusion principles
TRIPS ..... Trade-Related Intellectual Property Rights
UDHR ..... Universal Declaration of Human Rights
UNCTAD ..... UN Trade and Development
UN ..... United Nations
UNDP ..... United Nations Development Programme
UNESCO ..... United Nations Educational, Scientific, and Cultural Organization
UNFCCC ..... United Nations Framework Convention on Climate Change
UNGA ..... United Nations General Assembly
WHO ..... World Health Organization
WMD ..... Weapons of Mass Destruction
WTO ..... World Trade Organization

Executive Summary

> ***"Unprecedented technological capabilities, combined with unlimited human creativity, have given us tremendous power to take on intractable problems like poverty, unemployment, disease, and environmental degradation. Our challenge is to translate this extraordinary potential into meaningful change."***
>
> —Professor Muhammad Yunus, Chief Adviser and leader of the interim government of Bangladesh, Nobel Peace Prize Laureate, and Founder of the Grameen Bank.[1]

Under the banner of "Diplomacy, Dialogue, and Diversity," the Doha Forum has, for over two decades, promoted a spirited and open interchange of ideas to innovate and improve international policy-making through action-oriented networks. In this ***Future of International Cooperation 2024*** report, the Doha Forum, Stimson Center, and Global Institute for Strategic Research explore ways to fully leverage the generational opportunities provided by the convening and follow-through of the back-to-back, closely intertwined 2023 SDG Summit, 2024 Summit of the Future, and 2025 World Social Summit. To realize the full potential of these global diplomatic gatherings, it is crucial to engage action-oriented networks across governments, civil society, religious leaders, the media, the business community, and international organizations—both global and regional.

With this year's thematic focus on "**The Innovation Imperative: Tech-Governance, Development & Security at a Crossroads**," the report gives special attention to how technology and its governance can best advance and safeguard (or, inversely, hinder and endanger) fundamental global development and security goals, including the **2030 Agenda for Sustainable Development** and the quest for **sustainable peace**. The need for effective "**tech-governance**"—including through innovative global and regional governance tools and approaches—is more urgent than ever, given the accelerating pace of disruptive global forces that create new challenges, risks, and opportunities for development, security, the climate, human rights, and the global order itself.

Clear, foundational principles are essential for effective tech-governance. Applied to governing artificial intelligence (AI) and broader cybertech, greentech, and biotech, among other technologies in the global development space, they include: **safety, sustainability, transparency and inclusion,** and **just and human rights-centered**. In the peace and security domain, where the report examines the governance of AI and broader cybertech, weapons of mass destruction, and minerals for advanced (military and civilian) technologies, five closely related conceptual clusters of principles are introduced: **safety, transparency, and risk mitigation, responsibility and accountability, inclusion and participation, territorial integrity and sovereignty,** and **environmental protection**.

With the goal of making tech-governance in both the development and security spaces beneficial to present and future generations globally, while upholding these core principles, the report's chief recommendations include:

DEV TECH

Governing Technology for Global Development

Assemble an Independent International Scientific Panel on AI and Frontier AI Collaborative
In support of the proposed International Artificial Intelligence Agency (IA2; *see below*), while extending beyond the Global Digital Compact's current description, an Independent International Scientific Panel on AI (IISPAI) would be tasked with producing knowledge products and increasing awareness of AI risk, principles, and regulations for policy-makers. Modeled on the Intergovernmental Panel on Climate Change, the IISPAI's ultimate objective could be to understand and address the impact of emerging digital information technologies on the world's social, economic, political, and natural systems. A community of practice through an Frontier AI Collaborative would further assist the IA2 with a new international public-private partnership for expanding access to or funding innovation in AI technology from leading private sector AI developers, where much of the innovation happens outside the public realm.

Establish a Greentech Licensing Facility within the Green Climate Fund
By harnessing private sector innovation for climate mitigation and adaptation, a Greentech Licensing Facility (GtLF) would help vulnerable populations in developing countries overcome major barriers to green technology transfer. Participation from both public and private actors should be encouraged through, for example, tax breaks, subsidies, and global recognition programs for companies contributing to climate-friendly technology transfers. This could motivate Intellectual Property Rights (IPRs) holders to transfer licenses to the Green Climate Fund, which would act as an intermediary through the GtLF, facilitating access to these licenses for developing countries at subsidized rates.

Enable Biotech Capacity by Expanding Technical Transfers in the WHO Pandemic Agreement
The WHO Pandemic Agreement, now in its final stage of negotiations, should expand the reach of transfers across biotech beyond "pandemic-related" products in its final form, by avoiding a siloed definition of what should be transferred to developing countries. Many IPRs for more generic products and processes are currently acting as a roadblock to developing domestic biotech capabilities, such as with long established monoclonal antibodies and their associated therapeutic uses. Nations may be unable to develop pandemic prevention and response capabilities, even with pandemic-related Intellectual Property Rights, if they do not possess IPRs for the generic processes that underpin such capabilities.

SEC TECH

Governing Technology for Global Peace and Security

***Create an International Artificial Intelligence Agency* (IA2)**
The agency would serve to: i) improve visibility, advocacy, and resource mobilization for global AI regulatory efforts, capacity-building, and expanded access; ii) provide thought leadership on General Assembly, Security Council, World Trade Organization, and G20 AI and cyber-technology-related initiatives and agreements; iii) monitor, evaluate, and report on AI industry safeguards and AI compute, including through establishing an AI Chip Registry; iv) enhance coordination across Member States, the World Trade Organization, G20, and regional bodies to leverage AI's positive development applications; and v) coordinate transnationally across initiatives and frameworks on AI governance to support knowledge-sharing of best practices and lessons learned. While beneficial to advancing global

development too, in the peace and security domain the IA2 would help countries to combat AI-enabled disinformation and the resulting misinformation that can fuel violence and aid terrorist and criminal organizations.

Strengthen Weapons of Mass Destruction (WMD) Global Regulatory Frameworks and Tech-Gov Collaboration

Emerging technologies can enhance detection and defense capabilities against the threat of weapons of mass destruction. Blockchain, for example, can create immutable, transparent records of transactions and the movement of sensitive materials, thereby enhancing the monitoring and control capacities of WMD governance. Its integration into existing multilateral regulatory systems, such as those for nuclear, chemical, and biological weapons, can further help to harden WMD global governance, by ensuring that hazardous materials are safely and responsibly managed and tracked—to prevent these devastating weapons from falling into the wrong hands.

Launch a Global Initiative for Fair and Transparent Military Mineral Practices

Designed as a comprehensive international framework for governments, multinational corporations, and other stakeholders, a Global Initiative for Fair and Transparent Military Mineral Practices ("MMPs Initiative") is urgently needed to promote transparency, environmental protection, and accountability in the management of mineral resources for military purposes. Operating as a specialized entity inside the United Nations with active multistakeholder engagement, while drawing important lessons and insights from the Extractive Industries Transparency Initiative (EITI), the MMPs Initiative would facilitate implementation and monitor compliance of a global benchmark for transparency and accountability in the military-related mineral sector.

From the SDG Summit and Summit of the Future to the World Social Summit & Beyond

Building on the SDG Summit (which reinvigorated recovery post-COVID-19) and Summit of the Future (which addressed global governance gaps identified by the SDG Summit), next year's World Social Summit will advance efforts to eradicate poverty, achieve full and productive employment and decent work for all, and promote social integration. The three summits manifest various "win-win" linkages; in many ways, their respective success depends on the pursuit of the deep and varied connections between them. Together, they are poised to take forward the **2030 Agenda for Sustainable Development**, **2015 Paris Climate Agreement**, and **wider UN agenda**, including in the areas of economic governance and debt relief, science and technology, peace and security, human rights, and the needs of younger and future generations.

Several of the tech-governance innovations introduced in this report offer novel entry points for deepening the multiple, mutually reinforcing action agendas of the three successive summits culminating, in November 2025, in Doha. With courage, foresight, and creativity, leaders can seize the opportunity to equip their citizens not only to cope with disruptive global forces, but to thrive in today's hyperconnected world economy. Embracing the **Innovation Imperative** has become our generation's **moral and practical imperative** for achieving a safer, more just, and more prosperous future for all.

I. Introduction: Trends and Concepts

> ***"Nothing is as absurd and unacceptable in the 21st century as the persistence of hunger and poverty, when we have so much abundance and so many scientific and technological resources at our disposal."***
>
> —Luiz Inacio Lula da Silva, President of Brazil.[2]

In a fast-changing world, where disruptive global forces create new challenges, risks, and opportunities for development, security, the climate, human rights, and the global order itself, the need for innovative approaches to cooperation and problem-solving—including through global and regional institutions—has never been more urgent. In short, the need to innovate is not only beneficial, it is quickly becoming the moral and practical imperative of the present age. All countries, big or small and at varying stages of development, will need to innovate if their citizens are not only to cope with growing disruptions within and across borders, but to thrive in today's interconnected world economy.

This year's Doha Forum takes place between three historic intergovernmental and multistakeholder gatherings: last year's (September 2023) SDG Summit in New York, this year's (September 2024) Summit of the Future in New York, and next year's (November 2025) Second World Summit for Social Development (the "World Social Summit") in Doha. Through the *Future of International Cooperation Report 2024* (FIC'24), the Doha Forum, Stimson Center, and Global Institute for Strategic Research present a primer for Doha Forum participants, international policy-makers, journalists, and concerned citizens on the theme of "The Innovation Imperative: Tech-Governance, Development & Security at a Crossroads."

The Innovation Imperative represents an imperative to innovate for functionality, as well as an imperative to govern for justice. Secondly, it is qualitatively different to discuss technology-governance (or tech-governance; *defined below*) relative to how other areas of governance are cast, because technology is at the root of or interwoven into these other areas. Advances in artificial intelligence (AI), for instance, deepen challenges and opportunities across a range of issues at all levels of governance.

Third and finally, the timeliness of FIC'24 and new initiatives in this area matter.[3] Now is the time to ask, for instance: what does accountability look like in an "era of the autonomous?" What is the role of global and regional multilateral institutions in ensuring equality, peace, and justice in the technology space and digital domain? How can the key principles of innovation and tech-governance be applied to the major problems facing our world today? How can we allow for experimentation, and even failure, while maintaining stability and safety? How can we also solicit honest feedback, adapt, and remain open to change? How can we apply a listen-first, user-centric approach to issues of governance and policy,

centering the experience and well-being of individuals? And what institutions and practices—at all levels of governance—are required to harness technology's full potential for the benefit of all of humanity?

In short, the Innovation Imperative represents a shift toward more open, collaborative, and cross-sectoral models of innovation. In promoting real ingenuity in terms of new thinking and practice, dynamic and forward-looking settings must embrace diversity, including even sometimes difficult perspectives and ideas. Under the banner of "diplomacy, dialogue, and diversity," the 2024 Doha Forum will address issues of geopolitics, economic development, emerging technologies, security, and cultural diplomacy, and, in effect, serve as a global platform for considering how to apply the power and principles of innovation to the most pressing issues facing our planet. Before delving deep into these themes, the FIC'24 report first presents a brief overview of major global macrotrends, as well as key concepts and terminology.

Global Backdrop

Underpinning the *Future of International Cooperation Report 2024* is an acknowledgement of four key global currents—all presenting immense opportunities and consequential threats—across socioeconomic development and recovery, peace and security, the environment, and technology. Their intersectionality is reflected, for instance, in the crossover between socioeconomic development and technology, which sees digital innovation promising new economic opportunities for billions, while the digital divide remains, excluding over one-third of the world from access to the Internet.[4] A stable environment and polity are also essential prerequisites for global development. Indeed, the four currents also converge around the Sustainable Development Goals, whose progress has been knocked severely off-course by a confluence of both anticipated and unforeseen—natural and human-led–occurrences.

SOCIOECONOMIC DEVELOPMENT AND RECOVERY

Socioeconomic development and recovery, since the COVID-19 pandemic's peak in 2020-21, has been mixed. Although youth joblessness in global terms is at a historic low today, within specific regions and demographics, youth unemployment trends remain uneven.[5] In East Asia, South-East Asia, the Pacific, and within many Arab states, youth unemployment is rising.[6] Young women account for two-thirds of young people not engaged in employment, education, or training.[7] While the Global South broadly speaking faces issues of unemployment and corresponding low wages, most OECD countries are experiencing significant vacancy rates and rising real wages after the pandemic.[8] At the same time, 85 percent of the world's least developed countries are "commodity-dependent," with their economies relying on just a few commodities such as oil, copper, and wheat.[9] This has hindered the recovery of many developing countries challenged by the price volatility caused by the pandemic.[10]

Rising fiscal challenges (which were already pronounced before the onset of COVID-19) have hamstrung the capacity of developing countries to respond to a variety of socioeconomic problems. Notably, their collective public debt has grown by around 35 percent between 2020 and 2022.[11] Comparatively, developed countries experienced during this period an increase of just 8.1 percent.[12] The doubling of public debt globally since 2010 has, in effect, severely limited how developing countries cope with myriad challenges ranging from pandemics and fighting extreme poverty to climate change.[13]

PEACE AND SECURITY

In 2023, global military spending soared to over U.S. $2.4 trillion, a 6.8 percent increase from 2022, reflecting an intensifying global arms race.[14] State-involved armed conflicts reached an unprecedented number (59), the highest recorded since 1946.[15] The *Global Peace Index 2024* further identifies 92 countries engaged in conflicts beyond their borders.[16] Conflicts rooted in historical grievances, such as those in Gaza and Ukraine, point to the increasingly internationalized nature of contemporary conflicts.[17] For example, experts have warned that Israel's military actions in Gaza could spill over into a larger-scale regional conflict as clashes between Israeli forces, neighboring nations, and various armed groups intensify.[18] These growing complexities, alongside fears of regional escalation, are reflected in the sharp decline in conflicts ending in peace agreements, which have plummeted from 23 percent in the 1970s to just 4 percent in the 2010s.[19]

> ***Technological advancements and the rise of asymmetric warfare also complicate the global security landscape (as explored in section three). In 2023, all nine nuclear-armed states enhanced their nuclear capabilities, with some deploying new nuclear-armed or nuclear-capable systems, contributing to a record global nuclear weapons expenditure of U.S. $91.4 billion, a 13.4 percent increase from the previous year.***

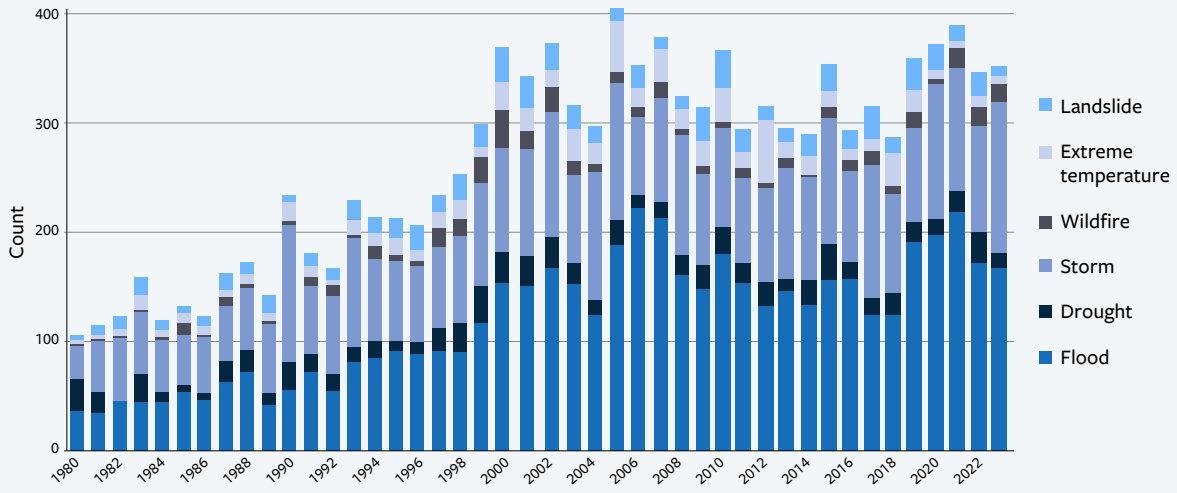
Technological advancements and the rise of asymmetric warfare also complicate the global security landscape (as explored in section three). In 2023, all nine nuclear-armed states enhanced their nuclear capabilities, with some deploying new nuclear-armed or nuclear-capable systems,[20] contributing to a record global nuclear weapons expenditure of U.S. $91.4 billion, a 13.4 percent increase from the previous year.[21] Nuclear tensions further contribute to global insecurity. At the same time, the use of drones by non-state actors, for example, saw a staggering 1,400 percent increase between 2018 and 2023.[22] Terrorism-related deaths also surged by 22 percent in 2023, with the majority occurring in conflict zones, underscoring the strong linkages between terrorism and conflict.[23] Together, these developments have grave implications for civilian life, as conflicts, climate change, and economic instability continue to drive humanitarian crises. In 2023, violent conflict forcibly displaced 110 million people and left 134.5 million acutely food insecure,[24] predominantly in the Middle East, North Africa, and Sub-Saharan Africa.[25]

ENVIRONMENT

On July 22, 2024, the earth recorded its hottest day in history, surpassing the previous record just a day earlier on July 21, 2024.[26] Between 2000 and 2019, models estimate that around 489,000 people died each year due to heat-related causes, with 45 percent of these deaths occurring in Asia and 36 percent in Europe.[27] Figure 1.1 further depicts a steady uptick in climate-related disasters over the past four plus decades. By 2023, disaster-related internal displacements equaled 26.4 million, 20.3 million were weather-related and 6.1 million were geophysical.[28] In the same year, atmospheric concentrations of greenhouse gasses continued to rise to dangerous levels, bringing the planet ever-closer to the 1.5°C Paris Climate Agreement threshold that most climate scientists have warned against crossing.[29]

Moreover, 99 percent of the world's population breathes air exceeding World Health Organization (WHO) air quality limits, impacting the low- and middle-income countries the most.[30] By 2021, 8.1 million deaths globally were attributed to air pollution, including 700,000 death cases in children under five.[31] Additionally, more than one in five (22 percent) of species listed under the Convention on the Conservation of Migratory Species are threatened with extinction, and 44 percent show a decline in population.[32] Deforestation and forest degradation are another global threat to biodiversity with nearly 100 million hectares of net forest area lost over the past twenty years. One of the main drivers of deforestation is agricultural expansion for croplands and livestock.[33]

Figure 1.1: Frequency of Climate-Related Disasters (1980-2023)



Source: IMF, Climate-related Disasters Frequency, *Climate Change Indicators Dashboard*, accessed August 22, 2024.

TECHNOLOGY

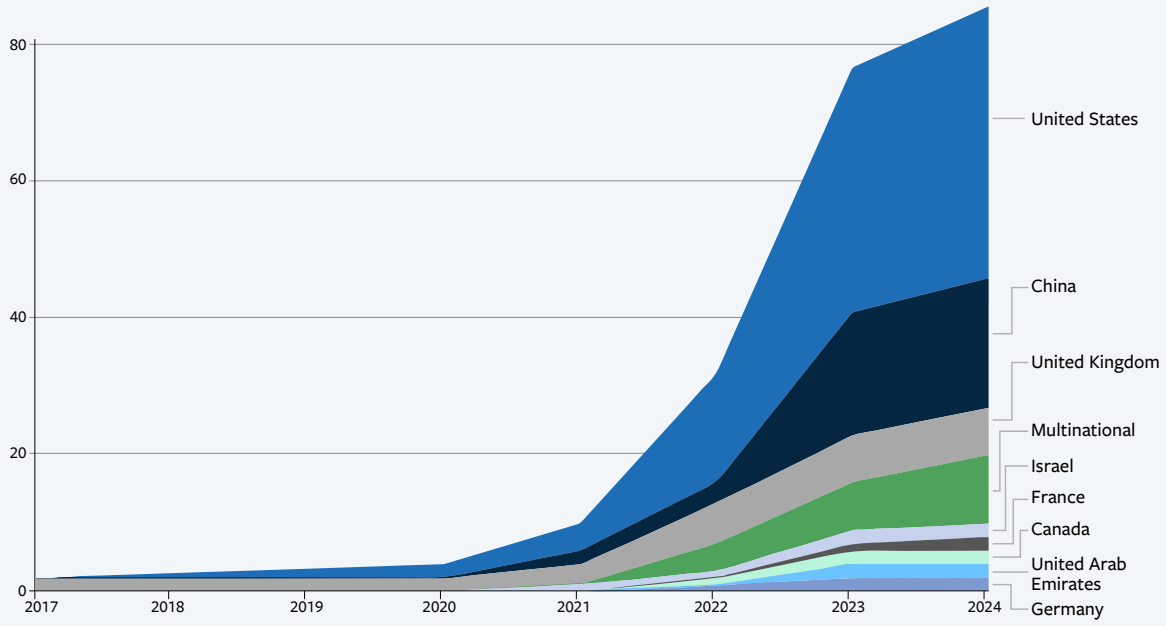
Technological progress and the course of human history have moved forward together; more recent technological innovations have emerged with unprecedented speed and reach, deeply influencing many areas of human activity.[34] For instance, as elaborated in this report, advances in artificial intelligence and machine learning (consisting of neural networks) enable machines to process new information in real-time,[35] and as federated learning becomes more widespread, machine learning models can collaborate without the need to share sensitive data, thereby enhancing privacy and security.[36] These technologies will find applications in sectors such as healthcare, where advanced algorithms can support personalized diagnosis and treatment.[37] New and emerging technologies, including nanotechnology and human

enhancement technology, have implications too for international peace and security.[38] At the same time, if present trends persist, only a few countries may dominate this space, in terms of both technological innovation and "setting-the-rules" for their governance (see figure 1.2).

> ***New and emerging technologies, including nanotechnology and human enhancement technology, have implications too for international peace and security. At the same time, if present trends persist, only a few countries may dominate this space, in terms of both technological innovation and "setting-the-rules" for their governance.***

Meanwhile, climate change's adverse threats will, increasingly, drive the green energy revolution, accelerating the development of negative emission technologies designed to remove carbon dioxide from the atmosphere.[39] Widespread public awareness will also help to reduce environmental impact, making carbon management and removal efforts more cost-effective and accessible.[40] Additionally, the European Commission is showing how biotech advances are reducing carbon emissions and enhancing sustainability efforts across various sectors.[41] And the integration of gene editing technology, such as CRISPR (clustered regularly interspaced short palindromic repeats) technology, as well as AI in biotech, is not only revolutionizing healthcare but also extending into environmental applications, such as improving crop resilience and developing sustainable energy solutions.[42]

Figure 1.2: Cumulative Number of Large-scale AI Systems by Country



Source: Our World in Data, "Cumulative number of large-scale AI systems by country, 2017-2024," accessed July 7, 2024. Data Source: Epoch (2024).[43]

Key Concepts in this Report

ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI) technology mimics the problem-solving and decision-making capabilities of the human brain, and typically has wider computing capacity than traditional cyber-technology.[44] While this report does not dive deeply into differentiated regulatory responses for foundational models and generative AI, it does consider the specific use of lethal autonomous weapon systems. It further provides an overarching framework for managing the development and use of emerging cyber-technologies with high uncertainty of risk, potentially large impacts on human rights, and typically concentrated asymmetries of power.[45]

AI COMPUTE

AI computing or AI compute refers to the large-scale technical capabilities including hardware, software, and resources, such as processing power, memory, or storage, that are required for the computational success of an AI model.[46] AI Compute is required to train models during development and for inferencing, meaning after deployment of an operational AI model.[47]

BIOTECH

Biotech is the application of science and technology to living organisms (including their constituent parts and products) in order to alter living or non-living material for the production of knowledge, goods, and services.[48] Biotech can be further defined by areas of science seen to fit its simple definition. Examples of these areas include DNA/RNA, bioinformatics, cell and tissue engineering, and nanobiotechnology.[49] The definition remains simple to allow for the broad and quickly changing nature of biotech.

CRITICAL RAW MINERALS

Critical Raw Minerals are raw materials of high economic importance, with a high risk of supply disruption due to their concentration of sources and lack of good, affordable substitutes.[50]

CYBER-GOVERNANCE

The United Nations focuses on digital cooperation when discussing governance of digital and cyber-technology, including principles of universal access and multistakeholder efforts to build better digital futures.[51] Many other platforms define cyber-governance in the context of cyber-security, encompassing risk mitigation, decision-making hierarchies, and system-level oversight.[52] This report considers cyber-governance at both the system-level management of technology and the global level—specifically, the global collective action required to strike a balance between regulation and innovation that generates sustainable, safe, and inclusive results (see "Revisiting Core Principles" in section two). While artificial intelligence is

an emerging form of technology in cyberspace ("cybertech"), it is also increasingly considered a peculiarly powerful and potentially disruptive technology worthy of singling out for special attention.

CYBERTECH

In this report, "cybertech" refers to non-AI technologies that typically have been more extensively researched, often subject to regulatory agreements and norms, and largely lacking AI's expansive self-learning capacity. Examples of advanced but non-AI cybertech include behavioral biometrics, "zero trust" architecture, blockchain, quantum computing, cloud security, and "Internet of Things" (IoT) security.[53]

DIGITAL PUBLIC INFRASTRUCTURE

Digital Public Infrastructure (DPI) refers to the comprehensive framework that digitizes various aspects of in-person life, including infrastructure, services, governance, regulations, data, markets, and people. DPI aims to foster digital inclusion, enhance service delivery, and promote equitable growth and innovation across sectors.[54]

DIGITAL RIGHTS

Digital rights extend the protections of the rights enshrined in the Universal Declaration of Human Rights and International Human Rights Instruments to the digital world.[55] Since human rights documents were created before the rise of advanced technology, they did not account for the digital environment. However, digital rights now ensure that civil, political, economic, social, and cultural rights are equally upheld, promoted, protected, and fulfilled by states in the digital space.[56]

DISINFORMATION AND MISINFORMATION

Disinformation is deliberate false information with the intention to deceive or secure economic or political gain, and which may cause public harm.[57] Misinformation is non-deliberate, false information that is created or spread erroneously, without necessarily the intent to do harm.[58] AI can be utilized by third parties to generate disinformation, and the sharing of AI-generated disinformation creates misinformation.

DISRUPTIVE TECHNOLOGIES

Disruptive technologies are innovations that significantly change how industries, businesses, or markets function, often displacing established methods. Popularized by Clayton Christensen in the 1990s, these technologies typically begin by addressing niche markets with simpler or more affordable solutions, eventually challenging mainstream applications and reshaping industries. They usually emerge from smaller companies and offer superior attributes that challenge the status quo. Examples include the internet, smartphones, and electric vehicles, which started as niche solutions and grew to disrupt established markets and industries.[59]

GLOBAL AND REGIONAL GOVERNANCE

Previous Stimson reports, including *Global Governance Innovation Report '23*, have considered the changing nature of global governance:

> ***"[G]lobal governance is essentially about the steering of institutions and resources to provide for global public goods and tackle global challenges effectively. Such steering requires not only power but also legitimacy and authority. Here, an emerging consensus becomes visible, including through the principles and ideas permeating the Our Common Agenda and High-level Advisory Board for Effective Multilateralism reports, that for global governance to be legitimate and authoritative in contemporary terms, it needs to be conducted in an evidenced-based, inclusive, networked, equitable, and future-oriented way. Global governance innovation typically involves reform initiatives to advance global institutional, legal, policy, normative, and operational change."***[60]

By extension, regional governance encompasses the steering of institutions and resources to provide for public goods on a regional basis and tackle regional challenges effectively. Such steering requires not only power but also legitimacy and authority.

GREENTECH

Green technology, or greentech, encompasses technologies designed to protect the environment by enhancing sustainability, reducing pollution, and minimizing waste. These technologies use resources more efficiently, recycle materials, and manage residual waste more responsibly compared to traditional methods.[61] While there is no universally agreed-upon definition of greentech, it is closely related to "environmentally sound technology," a concept defined in Agenda 21—a global action plan for sustainable development adopted by the United Nations in 1992—focusing on innovations that offer significant environmental benefits over existing alternatives.[62]

INTELLECTUAL PROPERTY RIGHTS

The World Trade Organization defines Intellectual Property Rights (IPRs) as "the rights given to persons over the creations of their minds." These rights typically provide the creator with exclusive control over the use of their creation for a specific period. IPRs encompass various categories, including copyrights, patents, and trademarks, each designed to protect different forms of intellectual creations.[63]

RARE EARTH ELEMENTS

Rare Earth Elements (REEs) represent a group of 17 elements, including the 15 lanthanides, plus scandium and yttrium, essential for many high-tech applications.[64] These are referred to as "rare" because although relatively abundant, they appear in low concentrations in the earth's crust, making extraction and processing both difficult and costly.[65]

TECHNOLOGY-GOVERNANCE / TECH-GOVERNANCE

Technology governance aims to implement shared values and protect human rights through principles, codes of practice and regulation, as well as modes of democratic participation and technology assessment. Technology governance is now recognized as a central pillar for helping countries and the international community to reap benefits of important technologies, mitigate risks, and build a more resilient future.[66]

***

In today's dynamic, fast-paced world where countries struggle to cope with growing global disruptions both within and across their borders, the Innovation Imperative acknowledges the private sector's central role in driving technological innovation, the public sector's role in both regulating and incentivizing technological innovation, and civil society's watchdog and normative development roles. Against the challenging global backdrop outlined above, technology-governance in the global development and security spaces depends, increasingly, upon creative and courageous outside-the-box ideas in support of a more just, sustainable, and peaceful future for all nations and peoples.

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In this spirit, the FIC'24 report examines pathways for reinvigorating partnerships, delivering on commitments, strengthening global and regional institutions, and closing inequality gaps exacerbated by converging crises—in short, spurring bold and concrete actions in support of the 2023 SDG Summit, 2024 Summit of the Future, and 2025 World Social Summit action agendas. It spotlights challenges, risks, and opportunities to reinforce improved (and collective) tech-governance in the three global development categories of artificial intelligence and broader cybertech, greentech, and biotech (section two) and to renovate tech-governance in the three global peace and security categories of artificial intelligence and broader cybertech, weapons of mass destruction, and minerals for military technology (section three). For these two chief analytical sections, the report further underscores key principles to guide international cooperation in each of these areas (especially through global and regional multilateral bodies), and presents future-forward policy and institutional reform proposals for better, long-term development and security outcomes. Section four then presents ways to advance these innovations in connection with the promises for a better tomorrow by world leaders participating in the above three critical world summits (2023–2025).

The FIC'24 report examines pathways for reinvigorating partnerships, delivering on commitments, strengthening global and regional institutions, and closing inequality gaps exacerbated by converging crises—in short, spurring bold and concrete actions in support of the 2023 SDG Summit, 2024 Summit of the Future, and 2025 World Social Summit action agendas.

II. Governing Technology for Global Development

> ***"With artificial intelligence already upon us, coordination on global rules is as important as having the technology and the skills to tap into it."***
>
> —Kristalina Georgieva, IMF Managing Director.[67]

Technology, including Artificial Intelligence (AI) and other cyber-technologies, greentech, and biotech, has the capacity to both accelerate and unlock development, including through the Sustainable Development Goals (SDGs), Agenda 2063 for Africa, and other ambitious global and regional development initiatives. At the same time, barring effective governance, these technologies can widen the chasm between those benefiting from technology's positive multiplier effects and those left behind—a newer version of the "haves" vs. "have-nots." Governing technology (or "tech-governance") for development requires identifying risk factors and implementing decisive policies and reforms that can steer humanity in one direction or the other.

Challenges explored in this section include the current technology divide, associated uncertainties and vulnerabilities, setbacks in global development goals in complex policy environments, and the narrow, often unaccountable, or ad hoc approaches to tech-governance today. This section proposes six innovations across the three areas of AI and other cybertech, greentech, and biotech to address these challenges and better leverage technology's promise for sustainable development. The section also builds on the "Safety, Sustainability, and Inclusion Principles (SSI) Framework," introduced in the *Future of International Cooperation Report 2023*, by presenting core principles that underpin these innovations.[68]

Major Challenges, Risks, and Opportunities

There is a spectrum of the policy and civic community across the globe which stretches from arguing that technology is a major risk and must be contained through regulation, or that technology is the answer to many of humanity's problems and that its pioneers must be allowed to innovate freely. The majority falls somewhere in the middle, trying to pinpoint the conditions for equilibrium that allow technology to innovate safely—and, increasingly, equitably too—for the betterment of all of humanity and our planet. In other words, they seek to skillfully navigate the challenges, risks, and opportunities associated with what stands in the way of landing on the right side of technology's most promising multiplier effects.

Many current and emerging technological challenges emanate from low Intellectual Property Rights (IPRs) transfer rates in biotech to the cost of royalties in greentech and its ad hoc licensing, to data and

algorithm bias in AI, and the lack of public infrastructure to access internet technology. What follows, however, maps out three cross-cutting challenges and opportunities that come together at the nexus of technology and development, thus shedding light on the need to revisit core principles and consider innovative policy and institutional reform proposals.

THE GLOBAL TECHNOLOGY DIVIDE

The global tech divide remains a significant barrier to sustainable development, with developing economies struggling to leverage emerging technologies due to limited access to the necessary knowledge, finances, infrastructure, and technical know-how. A 2023 report by UN Trade and Development (UNCTAD) highlights this growing concern, emphasizing the critical importance of "frontier technologies" for development.[69]

According to UNCTAD, the market for 17 frontier technologies,[70] valued at U.S. $1.5 trillion in 2023, is expected to grow to over U.S. $9.5 trillion by 2030 (see figure 2.1).[71] However, a stark gap exists in how many (especially developing) countries are able to fully utilize their potential and integrate emerging technologies into their markets. For example, while greentech exports from developed countries increased from around U.S. $60 billion in 2018 to over U.S. $156 billion in 2021, developing nations experienced a comparatively modest rise in their exports from U.S. $57 billion to only about U.S. $75 billion in the same period.[72]

Moreover, building accessible and resilient Digital Public Infrastructure (DPI) remains critical for advancing the Sustainable Development Goals and fostering safe and inclusive societies.[73] Yet, the digital divide persists with 2.6 billion people still offline and only 27 percent of the population in low-income countries connected to the internet in 2023—a 66-percentage-point gap compared to high-income countries.[74]

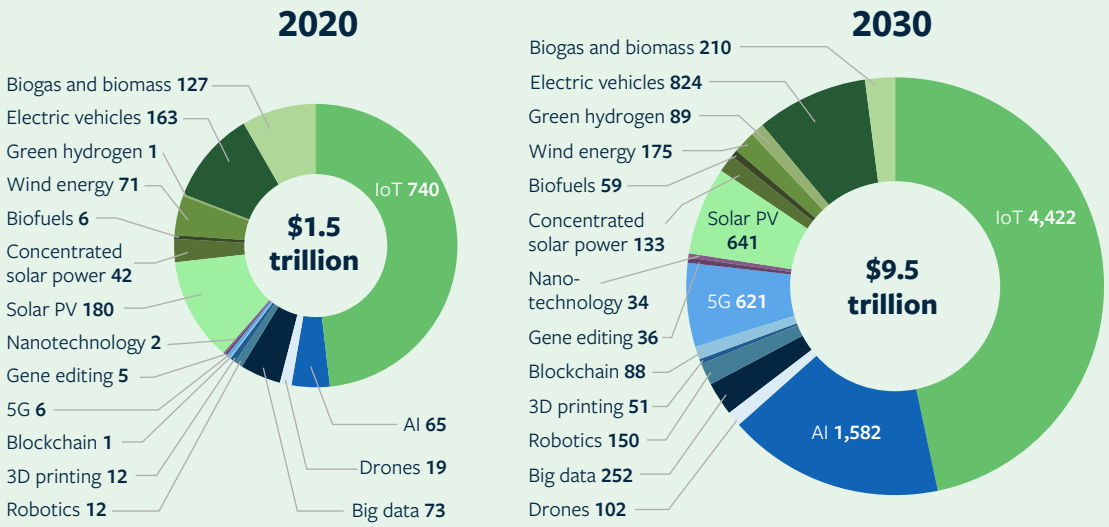
The disparity is further evident in global patents and publications concentration, where the U.S. and China dominate the knowledge landscape, holding nearly 70 percent of patents in 14 out of 17 frontier technologies and a combined 30 percent share of global publications.[75] In contrast, countries in Africa, Latin America, the Caribbean, and Oceania collectively held only 3.5 percent of the world's Intellectual Property Rights in 2022, down 1.2 percentage points from 2012.[76] Furthermore, with its reliance on Trade-Related Intellectual Property Rights (TRIPS) and other World Trade Organization (WTO) monitored agreements, the United States presents additional challenges for developing countries with respect to accessing critical technologies, while the U.S. simultaneously blocks WTO accountability systems.[77]

As the frontier tech market is poised to expand nearly six-fold in the next five years, developing countries are currently the least prepared to seize the opportunities this presents. UNCTAD has developed a Frontier Technology Readiness Index, which assesses countries' readiness to fully leverage these emerging technologies based on Information and Communication Technology (ICT) deployment, skills, research and development activity, industry engagement, and access to finance.[78] The index poignantly reveals that countries in Latin America, the Caribbean, and sub-Saharan Africa are among the least ready to adapt, adopt, and utilize frontier technologies, while high-income nations such as the United States, Sweden, Singapore, and Switzerland hold the highest readiness scores.[79] At the same time, Africa, for example, has the world's largest renewable energy capacity potential, predicted to reach 310 gigawatts by 2030,[80] underscoring the transformative impact (especially green) technology could have on sustainable growth across the continent and beyond.

This highlights a critical challenge too: it is not enough to ensure that technologies are accessible; countries must also have the capacity to develop, deploy, and effectively manage these technologies for sustained economic development and green growth. The rapidly evolving technological landscape presents "green windows of opportunity" for developing countries—opportunities that must be seized to avoid becoming trapped on a fossil-fuel dependent pathway and becoming overly reliant on foreign investors.[81]

Bridging this divide demands bold, out-of-the-box thinking, policies, and actions, alongside concerted global and regional efforts. Fostering collaboration, harnessing innovation, and promoting a responsive and accountable system of tech-governance with greater information-sharing individually, but especially in unison, can serve to accelerate progress toward the SDGs, safeguard human rights, and catalyze a global shift toward sustainable, inclusive growth.

Figure 2.1: Market Size Estimates of Frontier Technologies (U.S. $ Billion)



Source: UNCTAD, *Technology and Innovation Report 2023*, 14.

TURBOCHARGING THE SDGs

The "access gap," which in turn affects the "capacity gap," as described above, has profound implications for the United Nations' 193 Member States and their citizens' collective ability to achieve the Sustainable Development Goals.

In the *2024 Sustainable Development Goals Report*, published in the wake of the September 2023 SDG Summit (held at the half-way mark of the 2030 Agenda), the United Nations identifies technology as a key driver of progress across several goals, including enhancing educational opportunities, sustainable water resource management, inclusive and sustainable industrialization, poverty reduction, and gender

equality.[82] Technology is, thus, not just a stepping stone for achieving global and regional development objectives—it forms the modern backbone of development in the 21st century.

Despite this immense potential, only 17 percent of the SDGs are on course to be met by the end of the decade.[83] The risk of not achieving these goals is further heightened by the potential crossing of critical and irreversible environmental (planetary boundary) tipping points, particularly concerning climate change. Vulnerable countries can find themselves caught in a vicious cycle where complex shocks (caused, for example, by climate catastrophes or a pandemic) lead to SDGs' backtracking, which further increases the likelihood that strained governance systems are unable to cope effectively with future large-scale and often traumatic events.

Moreover, pre-existing development disparities can place additional pressures on the social, economic, political, and natural systems necessary for resilience against such shocks. Rising geopolitical tensions and Great Power rivalries can have a further negative multiplier effect, making global cooperation more difficult and the consequences of inaction even greater.

If managed well, AI-cybertech, greentech, and biotech could break open these cycles—fluctuating between great potential, on one hand, and great risk, on the other—and provide developing countries with the mileage needed to enter new, green growth opportunities. Equally important, rampant disinformation caused by biased AI algorithms (resulting in widespread misinformation), the concentration of IPRs with minimal transfer, and siloed approaches to governing frontier risks could accelerate unproductive cycles that, in effect, undermine chosen development goals. For example, the far majority of today's biotech industry is controlled by commercial enterprises, and compared to the, on average, 3 percent licensing royalty charged by academic institutions, private biotech firms command a significantly higher royalty at 8 percent.[84] This concentrates both economic and political power in largely Global North-based pharmaceuticals, further increasing costs and, ultimately, deepening the gap between those who can and cannot access vaccines and other pharma-products both within and between countries.

To fully realize the opportunities technology presents for sustainable development and Agenda 2030, we must bridge the tech-access and tech-capacity gaps, while mitigating risks and ensuring effective, accountable, and inclusive governance of technology.

SCOPING THE CURRENT STATE OF GLOBAL TECH-GOVERNANCE

Currently, global tech-governance is fragmented and decentralized, with varying principles and guidelines proposed or in force across different regions and technologies.[85] While there are numerous examples of regulatory frameworks for specific technologies, such as AI and other cyber-technologies (including the UN's development of a voluntary Global Digital Compact),[86] there is no universally agreed-upon set of foundational principles to guide tech-governance globally. The UN's High-Level Advisory Body on AI has taken a first step in outlining principles for AI governance, though this does not apply widely to all digital technologies or other frontier technologies.[87]

This lack of a cohesive, principled framework hinders the ability to effectively manage the commonalities (and even convergence) of emerging technologies and to address the complex risks and opportunities they present.[88] It also increases the likelihood of "forum shopping" by both private

companies and countries, where different clubs and regulatory fora are sought until an actor finds their most preferable configuration.

The decentralization of obligations and duties across various sectors and jurisdictions exacerbates this challenge, leading to gaps in cooperation, a lack of common information sources, and the persistence of data silos.[89] A lack of accountability in the regulatory frameworks that do exist also constitutes an area of concern. For example, AI governance is primarily dependent on voluntary guidelines, while the private sector has provided the vast majority of funding for digital public infrastructure, which complicates the landscape of responsibilities. Notably, research from the International Association of Privacy Professionals found that over 70 percent of organizations rely at least somewhat on third-party AI.[90] This reliance dilutes the responsibility for ensuring that AI systems are safe and responsible across multiple roles, further complicating effective governance and making it even more important that responsive, global frameworks for tech-governance are adopted.

Moreover, insufficient funding for greentech research and development, coupled with a persistent stalemate over how to address restrictive trade regulations and Intellectual Property Rights protections, create major challenges for countries unprepared to harness the economic and climate-related opportunities of the global greentech surge.[91] These issues hinder the development of a unified approach to tech-governance that can keep pace with rapid technological advancements.

Increasingly, governance experts and policy-makers are recognizing the need for anticipatory, scientifically informed, and agile governance in the emerging, frontier tech space.[92] An Organisation for Economic Co-operation and Development (OECD) policy paper, published in April 2024, emphasizes the importance of anticipatory governance for emerging technologies. It proposes a framework to help countries foresee and better manage the challenges, risks, and opportunities associated with new technologies, particularly in areas such as privacy, security, equity, and human rights. The framework includes five core components:

> ***"i) embedding values throughout the innovation process; ii) enhancing foresight and technology assessment; iii) engaging stakeholders and society; iv) building regulation that is agile and adaptive; and v) reinforcing international cooperation in science and norm-making."***[93]

The challenges outlined above and recommendations detailed below, including calls for novel thinking on how to best govern emerging (and converging) technologies for development, underscore the need for a more coordinated, global approach to tech-governance, one that ensures both the protection of human rights and the promotion of innovation in the pursuit of sustainable development that benefits all nations and peoples.

Revisiting Core Principles

While governance of technology spans multiple forums (global, regional, national, and sub-national), common tested governing principles have emerged, many enunciated in the United Nations' new Global Digital Compact.[94] The *Future of International Cooperation Report 2023* (FIC'23) mapped foundational guidelines, including from UNESCO,[95] the OECD,[96] G20,[97] and other global, regional and international bodies, and presented the *Safety, Sustainability, and Inclusion* (SSI) principles model.[98]

This section of the *Future of International Cooperation Report 2024* (FIC'24) expands on this framework, enhancing the SSI model through a development lens, resulting in the following set of tech-governance principles: *Safety, Sustainability, Transparency and Inclusion, and Just and Human Rights-Centered* (figure 2.2). The subsequent section three considers tech-governance from the vantage point of peace and security.

Figure 2.2: Core Principles on Governing Tech for Global Development

Source: Original Figure, Stimson Center.

SAFETY

The safety principle in FIC'23 includes artificial intelligence risks, encompassing both safety-engineering and security risks. Safety engineering entails ensuring that AI systems are safe, while security risks address both traditional cyber threats and new risks from autonomous AI (see further development of

these ideas in section three).[99] For global development, safety also means mitigating biases (including access and representation) against distinct population groups within society.

Access to Data

The safety principle embeds key understandings of the use, processing, and analysis of data, while ensuring individual privacy and data protection based on international standards and binding treaties. This requires advancing agile regulatory frameworks at all levels. For instance, the Council of Europe updated, in 2018, its Convention for the Protection of Individuals with Regard to the Processing of Personal Data, in order to address new privacy issues by reinforcing principles like data minimization and data breach reporting.[100] The evolving digital landscape highlights the need for robust regulatory frameworks and international safeguards to ensure privacy and responsible data use.

Encountering Bias

Human biases have been transferred into artificial intelligence, perpetuating discrimination based on gender, race, ethnicity, and socioeconomic characteristics.[101] Addressing these biases plays an important role in achieving the Sustainable Development Goals and preventing deepening stereotypes, especially against underrepresented communities. Research shows that biased AI systems can exacerbate social inequalities. For example, a 2018 Massachusetts Institute of Technology study found that facial recognition algorithms were less accurate in identifying women and people of color, with error rates of up to 34 percent for dark-skinned women, compared to 0.8 percent for light-skinned men.[102] This discrepancy can lead to unfair treatment in various sectors of society.

SUSTAINABILITY

The *Future of International Cooperation Report 2023* highlighted the challenges of regulating rapidly advancing AI and other cyber-technologies and underscored the need for sustainability of the governance regime itself, from application to universality, in part to address forum shopping.[103] For fostering global development, understood as increasing freedom of opportunities worldwide,[104] the orientation of technology toward long-term goals, and at the minimum, to not deprive future generations of development opportunities, represents both a moral and practical imperative.

General Assembly Resolution 72/279 underscores the United Nations Sustainable Development Cooperation Framework as the primary tool for planning and executing UN development activities at the country level in support of the 2030 Agenda for Sustainable Development.[105] Concurrently, the framework emphasizes technology for sustainable solutions to help countries meet their SDG commitments, such as combating climate change, eliminating poverty, and ensuring equitable access to economic and social services.

This holistic approach reflects the norm of increasing capacity and access to technology itself, including through infrastructure and information-sharing mechanisms to build capacity internationally (see related policy and institutional reform recommendations below).

TRANSPARENCY AND INCLUSION

The FIC'23 report detailed seven core dimensions of inclusion.[106] In the context of global development, transparency merits greater attention, as it is essential to building trust for collective action. Vigorous levels of transparency are manifested through meaningful participation that embraces a multistakeholder approach, and inclusive international cooperation.

Meaningful Participation

Meaningful participation implies extending beyond simply being merely invited and achieving basic geographic representation of key stakeholder groups. It includes incorporating deep, multidimensional approaches that consider historical context and current struggles of the Global South and underrepresented populations in tech-governance decision-making. This requires taking a decolonial approach to participation, inclusion, and governance (box 2.1). In the absence of such thinking, society is viewed homogeneously, and long-standing power asymmetries and (all-too-often) Global North-originated narratives are reinforced.

Box 2.1: Characteristics of a Decolonial Approach to Tech-Governance

- **Multidimensional** (includes, by design, a plurality of perspectives from, for instance, populations affected by a new technology, minority groups, humanitarian organizations, and tech-governance actors, advocates, and ethicists)
- **Rigorously analyzes potential harms and broader effects on future generations** (recognizing that neither rights nor harms are static)
- **Interrogates who absorbs potential future harms**
- **Grounded in the rights and equity of impacted minority groups**
- **Is emergent and acts as a compass** (not a checkbox) for policy-making

Modified from: Krishnan, "Decolonial Humanitarian Digital Governance," *Medium*.

Multistakeholder Approach and Inclusive International Cooperation

Multistakeholder approaches are crucial in global development, especially in AI and cybertech, biotech, and greentech, due to the potential for both positive and negative spillover effects between the public, private, and related social sectors. These high-tech fields often require advanced expertise across different stakeholder groups to truly map the levers of change and areas of marked societal impact. This principle played a crucial role in fighting the pandemic when governments incentivized private corporations in accelerating the development of effective and safe vaccines. However, when not coupled with meaningful participation and trust worldwide, the disproportional effects in responding to COVID-19 globally in an

equitable manner were also observed.[107] Multistakeholder approaches are crucial to bridging the Global North-South divide in frontier technology and paving the way for a more networked, inclusive, and broad-based development model.

International Cooperation

Transparency in the governance of technology requires international accountability mechanisms for both public and private sectors, as proclaimed in the UN High Commissioner for Human Rights' call for increased transparency, oversight, and regulation to mitigate the adverse effects of new and emerging digital tools and online spaces on human rights.[108] This requires effective international cooperation and includes public access to financial information and project details, especially for green and biotechnologies. Comprehensive reporting on funding and expenditure ensures responsible investment, while thorough risk assessments and mitigation strategies foster public trust and ensure that technological advancements benefit society at large.

JUST AND HUMAN RIGHTS-CENTERED

Technology wields the potential to assist states in fulfilling their obligations under agreed international human rights frameworks. Just and human rights-centered technology-governance can empower citizens with access to their most fundamental rights.

> ***The committee offers a comprehensive definition and strategy for protecting, promoting, and fulfilling rights to education under Article 13 of the International Covenant on Economic, Social, and Cultural Rights. These principles can be equally applied to technology, highlighting how human rights intersect with technological progress. Since this approach has not yet been applied to technology, exploring its adaptation to current and emerging technologies could prove invaluable.***

The Universal Declaration of Human Rights (UDHR) states, "All human beings are born free and equal in dignity and rights."[109] This has evolved, over time, to include "digital rights," as well as the proper and appropriate use of technology to ensure that digital divides do not prevent certain groups from accessing their rights in the modern age. For example, the COVID-19 pandemic's rapid shift to online learning excluded at least half a billion pre-primary to upper secondary students worldwide, impacting many of the poorest, including rural-based children, by preventing them from realizing their right to education.[110]

The *Future of International Cooperation Report 2024* introduces just and human-rights centered to tech-governance as an independent principle, incorporating well-tested human rights-based approaches (HRBA)[111] and past principles adopted, in 1999, by the UN Committee on Economic, Social, and Cultural Rights.[112] In particular, the committee offers a comprehensive definition and strategy for protecting, promoting, and fulfilling *rights to education* under Article 13 of the International Covenant on Economic, Social, and Cultural Rights.[113] These principles can be equally applied to technology, highlighting how human rights intersect with technological progress. Since this approach has not yet been applied to technology, exploring its adaptation to current and emerging technologies could prove invaluable (box 2.2).

Box 2.2: Exploring the Definition of the Right to Education as Applied to Technology (the "4 A's")

Availability: Tools and applications of technology and their benefits should be made publicly available.

Accessibility: The goods and benefits created by technologies should be accessible to citizens across the following three dimensions:

- *Non-discrimination:* Accessible to everyone without discrimination, especially vis-à-vis vulnerable and underrepresented communities (as articulated within adopted human rights treaties).
- *Physical access:* Ensuring access to information on how to use and navigate digital spaces, as well as access to physical spaces and infrastructure where citizens can fully utilize digital services.
- *Economic accessibility*: Technology must be affordable. This involves at least two layers of understanding:
  - *State-level:* States must have the economic means to develop and create digital spaces, advance their digital infrastructure, and achieve their (international and domestic) commitments, including the SDGs.
  - *Citizen-level:* Citizens must have affordable access to technology or the means and tools that allow them to utilize technological services to participate in the local, national, regional, and global economy.

Acceptability: Designed and implemented in a way that is acceptable to users, avoiding the strengthening of stereotypes and assumptions that could violate people's rights. Form and substance must be respectful to diverse communities.

Adaptability: Flexible and capable of adjusting to the rapid pace of technological advancements and the evolving needs of society.

Source: Original Box, Stimson Center. Data source: Committee on Economic, Social and Cultural Rights at the Twenty-first Session, General Comment No. 13: The right to education (article 13) *E/C.12/1999/10*, OHCHR.

Global and Regional Governance Innovations for Delivering Results

With the above core principles in mind, and given the challenges, risks, and opportunities faced in developing and leveraging technology for sustainable development, global and regional governance innovations are introduced below. Each of the six recommendations—with two across AI and cybertech, greentech, and biotech, respectively—focuses less on adding new institutions to the global regime complex and more on strengthening existing institutions or ideas under consideration in the run-up

to the UN Summit of the Future, 29th session of the Conference of the Parties to the UN Framework Convention on Climate Change (COP29), next year's AI Summit, and the anticipated finalization of a new treaty on strengthening pandemic prevention, preparedness, and response.

ADVANCING COMPREHENSIVE APPROACHES TO AI AND CYBER-GOVERNANCE

The rapid pace of AI and other cybertech innovations both wields great potential for development but also, left unchecked, poses great risks for the ability of present and future generations to access development opportunities (see safety and sustainability principles above). Effective regulation to maximize benefits and minimize risks requires the astute combination of advanced knowledge, multistakeholder approaches, and an agile policy interface. The rapid rise of AI Safety Institutes, fast becoming an important part of the AI ecosystem for addressing possible challenges posed by AI, is another clear example.[114] As AI emerges as a global concern, nations are increasingly seeking opportunities for collaboration, including by launching, in May 2023, the Hiroshima AI Process,[115] and also signing, in May 2024, the Seoul Declaration (highlighting the significance of AI Safety Institutes).[116]

The innovations below discuss how global and regional governance reform proposals currently under consideration by international policy-makers, including through a new UN Global Digital Compact, the G20 Declaration, and outcome at next year's AI Action Summit, can be enhanced to overcome potential siloing, reduce possible harms, and fully harness rapid technological changes. Critically, a human rights-based approach remains central to digital technological development and governance that leaves no one behind.

Assemble an Independent International Scientific Panel on AI and Frontier AI Collaborative as Part of the IA2

An Independent International Scientific Panel on AI (IISPAI) as presented in the Global Digital Compact's Revision 3 - 55 (a), could offer a representative stakeholder perspective "to promote scientific understanding through evidence-based impact, risk, and opportunity assessments, drawing on existing national, regional, and international initiatives and research networks (see SDG 17)."[117] A model for such a body was presented in FIC'23 as the Intergovernmental Cyber and AI Panel, following ideas from the Intergovernmental Panel on Climate Change (IPCC) and with the objective of understanding and addressing the impact of emerging digital information technologies on the world's social, economic, political, and natural systems.[118] The body would be tasked with producing knowledge products and increasing awareness of AI risk, principles, and regulations for policy-makers. FIC'23 also recommended that the UN's High-Level Advisory Body on AI be tasked with constructing this proposed panel.[119]

In Revision 3 of the Global Digital Compact, the following actions are proposed for this new body:

> ***"56. We therefore request the President of the General Assembly to appoint at the 79th session of the General Assembly co-facilitators, one from a developed country and one from a developing country, to identify through an intergovernmental process and with consultations with other relevant stakeholders the terms of reference and modalities for the establishment and functioning of the [Independent] International Scientific Panel on AI and a Global Dialogue on AI Governance for the adoption by the General Assembly."***[120]

As a key agenda item for the Global Dialogue on AI Governance, this report proposes having the IISPAI function as a subsidiary body of, and with direct administrative support from, an International Artificial Intelligence Agency (IA2), as elaborated in section three. The extraordinary pace of AI innovation requires an agile and fast-paced approach to scientific assessment by continually evaluating the technology's evolving capabilities and ramifications. This can be done by combining stakeholder and scientific expertise with the ongoing work of the United Nations Development Program (UNDP), the International Telecommunication Union (ITU), the UN Educational, Scientific and Cultural Organization (UNESCO), and the Human Rights Council. Critically, a scientific panel (like the IISPAI) requires an agile policy platform (like the IA2), as a chief beneficiary of IISPAI's analysis and recommendations. This will help to ensure its policy relevance and impact, as well as to serve as a central coordination mechanism for AI and related cybertech expertise across the UN system.

Additionally, the Independent International Scientific Panel on AI can benefit from leveraging the multistakeholder expertise of the AI & Cybertech Governance ImPact Coalition. Indeed, members of this coalition, created as an outcome of the May 2024 UN Civil Society Conference in Nairobi, have actively contributed to consultations on IISPAI's establishment.[121] This collaboration would facilitate the representation of experienced voices from the Global South and complement the expertise of the High-Level Advisory Body on AI already hosted by the UN Tech Envoy's Office. Along these lines, policy-makers and experts have suggested forming new kinds of cooperation to develop and distribute advanced AI systems, ensuring that these technologies are accessible to a diverse international coalition of state and non-state actors.

Furthermore, the report suggests (figure 2.3) that the IA2 adopts, among other priorities and the mandate described in FIC'23, three streams of work, namely: i) research and science (the proposed IISPAI), ii) an agile and stable monitoring and policy interface (the IA2; see section three and *Global Governance Innovation Report 2024*),[122] and finally, iii) a community of practice to allow for knowledge-sharing and resource pooling. Here we propose introducing a Frontier AI Collaborative.

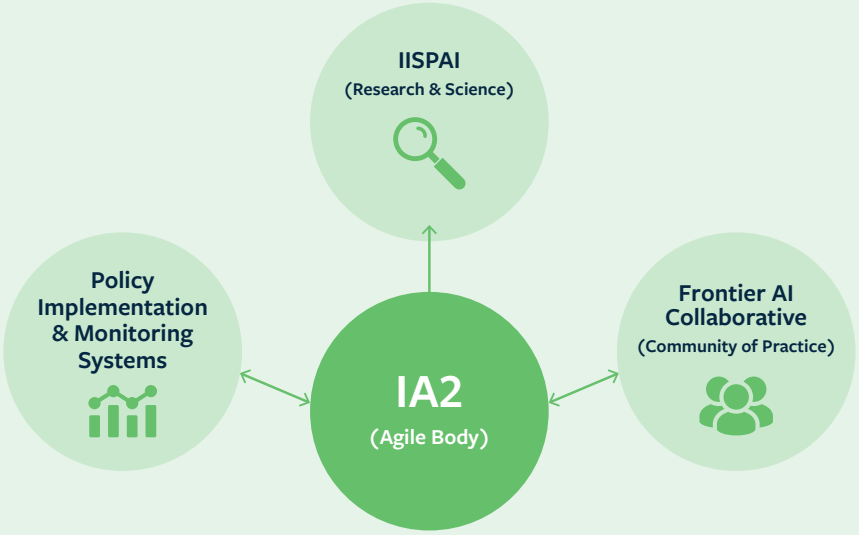
Considering the high costs involved in developing cutting-edge AI and the incentives and barriers surrounding Intellectual Property Rights, a Frontier AI Collaborative could function as an international public-private partnership, monitored and supported by the IA2. Many models of such a collaborative exist, including the AI Frontier Network,[123] the AI for Good Network,[124] the Global AI Frontier Lab,[125] and others. The key recommendation with this collaboration is to connect such frontier AI collaboratives to an agile and effective policy platform, such as the proposed IA2.

This community of practice would leverage existing industry technology and capacity by, for instance, expanding access to or funding innovation in AI technology from leading AI developers. Such a collaboration could draw inspiration from international public-private partnerships like the GAVI Vaccine Alliance or the Global Fund to Fight AIDS, Tuberculosis, and Malaria.[126] In line with the consensus Resolution on Artificial Intelligence by the UN General Assembly on March 11, 2024, "to take action to cooperate with and provide assistance to developing countries towards inclusive and equitable access to the benefits of digital transformation and safe," this proposal calls for the creation of an international public-private partnership that privileges this goal.[127]

The Frontier AI Collaborative would acquire or develop AI systems and distribute them, pooling resources from Member States and international development programs. It would work with leading (private and public) AI labs to provide suitable technology and partner with local businesses, NGOs, and beneficiary

governments to understand technological needs and overcome usage barriers. This initiative would seek, first and foremost, to facilitate the development of technology that better serves the Global South.

Figure 2.3: Operationalizing the IA2 for Development



Source: Original Figure, Stimson Center.

Foster a Human Rights-centered Approach to Digital Public Infrastructure

At the G20 Leaders' Summit on November 22, 2023, Indian Prime Minister Narendra Modi announced the Global Digital Public Infrastructure Repository initiative.[128] This initiative is designed to serve as a resource-sharing hub for G20 members and guest countries, aiming to close the knowledge gap in designing, building, and deploying population-scale Digital Public Infrastructure.

DPI governance is a critical challenge for countries due to its complexity and resource requirements, as well as human rights obligations. However, DPI can still help to advance major principles of tech-governance in the development space. Specifically, DPI needs to contribute to global development goals from the SDGs, the Addis Ababa Action framework, the Paris Agreement, the African 2063 Agenda, the European Union Green Deal, and other international and regional development frameworks. At the same time, rapid and unchecked development of DPI itself presents the risk of potential human rights breaches.

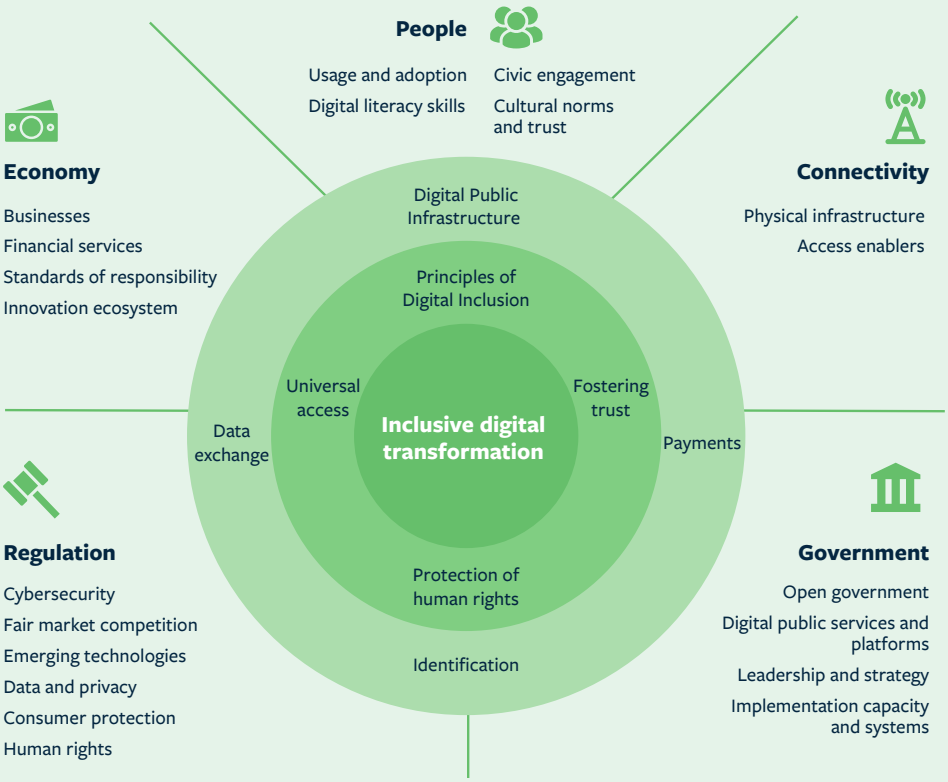
The UN's 2024 interim report, *Leveraging DPI for Safe and Inclusive Societies*, outlines a first draft for high-level DPI safeguard principles, a multi-stakeholder initiative stewarded by the Office of the United Nations Secretary-General's Envoy on Technology (OSET) and UNDP. The interim report dedicates a significant portion to human rights, calling for urgent guardrails and considers the risks that create an unfriendly environment for human rights.[129] Revision 3 of the Global Digital Compact further introduces substantive human rights language that bases digital cooperation on international law and international

human rights law.[130] However, the DPI section in the Compact fails to explicitly underscore the intersections with human rights. Fortunately, the digital era has introduced the concept of "digital rights" (see section one), which should be viewed similarly to traditional human rights and help to enrich the understanding and application of Digital Public Infrastructure.

DPI, therefore, represents a means to achieving Digital Rights, but it must also be built out in a broad-based and equitable way that leaves no one behind. This is a central idea to the integrated Sustainable Development Goal (or "iSDG") on technology, proposed in the *Future of International Cooperation 2023*, which positions the Global Digital Compact as a digital accelerator in support of all seventeen SDGs.[131]

Implementation of Human Rights-Based Approaches must begin during the development phase of DPI planning. From October 1 to 3, 2024, Egypt will host the Global DPI Summit in Cairo, bringing together various stakeholders, including the public and private sectors and civil society.[132] The forum aims to highlight the impact of Digital Public Infrastructure, provide a comprehensive overview of the field, and share implementation models to reshape public infrastructure in terms of thinking, policy, and practice. Notably, though, the convening's publicly available agenda does not reference human rights or even dedicate a session to the topic.[133] It is important for policy-makers to adopt a multidimensional approach when working on DPI-related topics, in particular ensuring that human rights feature in discussions across diverse policy platforms (figure 2.4).

Figure 2.4: A Multidimensional Approach to Digital Public Infrastructure



Source: UNDP, *Digital Transformation Framework*, accessed August 14, 2024.

INTEGRATED APPROACHES TO LEVERAGING GREENTECH FOR DEVELOPMENT

The global green technology wave, still in its early stages, presents a significant opportunity for developing countries to diversify their economies, achieve long-term socioeconomic benefits, and contribute to climate mitigation and adaptation efforts worldwide.[134] Targeted government-led investments, global community support, and an enabling framework of international rules and regulations will allow developing countries to seize these opportunities—provided that necessary reforms are implemented swiftly, with both national and multilateral support, while conditions remain favorable.[135]

As green growth opportunities rise,[136] leveraging both new and established scholarship and scientific innovation becomes crucial for enhancing global and regional tech-governance. Against this backdrop, the section presents two policy and institutional reform proposals, grounded in current debates and extensive research, to support broad-based, sustainable development through strengthened greentech trade and innovation. Furthermore, their active pursuit reflects sentiments widely expressed in the (Revision 3) Pact for the Future, including its focus on financing for development and building capacities for the development and implementation of green technologies.[137]

Establish a Greentech Licensing Facility Within the Green Climate Fund

Despite numerous global and regional initiatives promoting the transfer of green technologies to the Global South—such as the UN Climate Technology Center and Network (CTCN), the Global Environment Facility, the Adaptation Fund, the EU's Global Gateway partnerships, and the African Renewable Energy Initiative—restrictive trade rules and intellectual property rights remain significant barriers to green growth in developing countries.[138] Key reports from organizations like UN Trade and Development and the High-Level Advisory Board (HLAB) for Effective Multilateralism highlight the urgent need to reform trade and IPR rules to align with ambitious climate change goals and facilitate green technology transfers.[139]

By establishing a Greentech Licensing Facility (GtLF) within the Green Climate Fund (GCF), as recommended in this report, major barriers to green technology transfer can be overcome, thereby fostering more equitable access globally to greentech. Initially proposed by the Commission on Global Security, Justice & Governance, in 2015, based on the novel thinking of Dr. Menno van der Veen,[140] and since supported by both academics and policy-makers,[141] such a facility would help to promote a just green transition, while creating unique opportunities for sustained socioeconomic development.

The facility should be managed by the GCF to leverage the organization's existing mandate and impact. Since producers tend to view IPRs as catalysts for innovation, while developing countries typically see them as barriers, a robust incentive structure is crucial for the facility's success.[142] Participation from both public and private actors should be encouraged through, for example, tax breaks, subsidies, and global recognition programs for companies contributing to climate-friendly technology transfers. This could motivate IPR holders to transfer licenses to the GCF, which would act as an intermediary through the GtLF, facilitating access to these licenses for developing countries at subsidized rates.

To ensure the financial sustainability of the facility, the GCF would need to secure a consistent funding stream, requiring both political will and long-term commitments from developed nations and private sector contributions. Innovative funding options, such as GCF-issued climate bonds and public-private

investment funds, should also be explored.[143] Launching pilot projects with willing countries and companies could demonstrate the benefits and feasibility of the facility, serving as proof-of-concept to encourage broader buy-in. Furthermore, the GCF should support beneficiary nations that utilize the facility to harmonize their national Intellectual Property Rights laws and establish clear dispute resolution mechanisms to build confidence among IPR holders.

Furthermore, combining the GtLF with reforms to increase the flexibility of the WTO Trade-Related Aspects of International Property Rights Agreement merits consideration. Similar to the extraordinary measures used during the COVID-19 pandemic for vaccine production and distribution,[144] this would facilitate the creation of the new facility by giving the Green Climate Fund, as the GtLF parent organization, the requisite mandate.[145] Including provisions for compulsory licensing within TRIPS under certain conditions can ensure access to essential green technologies, which are vital for effective climate adaptation and mitigation.

Strengthen the UNFCCC's Climate Technology Center & Network to Promote Global Greentech Innovation, Research, and Capacity-Building

While transferring IPRs and easing trade restrictions are essential for promoting greentech growth, they are futile without the accompanying co-creation of capacities and knowledge.[146] Several recent reports have proposed creating new research centers or networks—such as a Science-Policy-Action Network (SPAN) suggested by both HLAB and the Climate Governance Commission—to foster greater global cooperation and contribute to capacity-building in the transition away from fossil fuels to a renewable energy based economy.[147] However, given the need to focus heavily on the diffusion of greentech-related knowledge (while rationalizing scarce public resources for climate action), we propose revisiting and finding creative ways to enhance existing structures, particularly the UN's Climate Technology Center and Network and the related UN Framework Convention on Climate Change (UNFCCC) Tech Mechanism.[148]

CTCN—established in 2014 and based out of Copenhagen, Denmark—constitutes the operational arm of the UNFCCC Tech Mechanism.[149] It supports developing countries by providing technical assistance, facilitating access to knowledge and information, and linking them with a global network of climate technology experts, policy-makers, and investors to help identify, adapt, and implement tailored climate technology solutions (without charge for a value up to U.S. $250,000).[150] Its mandate includes responding to technical assistance requests submitted by National Designated Entities from these countries.[151] While the country-centered and demand-driven approach of CTCN is commendable,[152] greater emphasis is needed on bridging the knowledge and access gap between developing and developed countries (as identified above) and establishing robust, meaningful partnerships that extend beyond principally providing advice and assistance. As the Climate Technology Center and Network heads into its second decade, it is essential to maintain the organization's main ethos, while expanding its mandate to be more proactive and to leverage its existing network of expertise more effectively.

Specifically, strengthening the CTCN should involve:

i) ***expanding the center and network's authorities beyond technical assistance*** to include policy advisory services, regulatory support, and market creation strategies that facilitate the adoption of green technologies. This includes granting CTCN more autonomy in decision-making, allowing it to

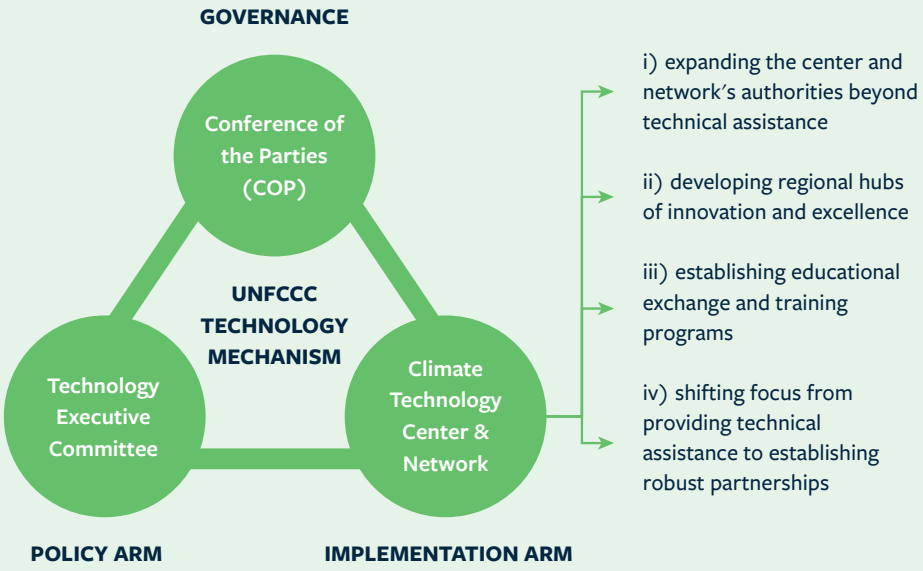
initiate and lead projects based on identified needs. This should involve proactive identification of technology transfer opportunities and challenges.

ii) ***developing regional hubs of innovation and excellence*** that can serve as centers for research, development, and dissemination of green technologies, while promoting and safeguarding the inclusion of indigenous, traditional, and local knowledge to improve or adjust technologies to address local and regional needs.[153]

iii) ***establishing educational exchange and training programs,*** as well as co-creation initiatives between universities in different countries (integrated into CTCN's network), to train future generations in sustainable practices and innovative green technologies, while promoting a collaborative approach to knowledge-sharing and enhancing Global North-South, Global South-South, and triangular capacity transfers in a more substantive way.[154]

iv) and ***shifting the focus from providing technical assistance to establishing robust partnerships*** and meaningful exchanges that promote broad-based, cross-sectoral, and sustainable development through greentech (see figure 2.5).

Figure 2.5: Strengthening the Climate Technology Center & Network



Source: Original Figure, Stimson Center. Modified from: TT:CLEAR, "Technology Mechanism," Accessed August 17, 2024.

ADVANCING COLLECTIVE ACTION IN BIOTECH GOVERNANCE

The Pandemic Prevention, Preparedness and Response Accord (WHO Pandemic Agreement), currently under negotiation, could have major consequences for the governance of the biotech industry.[155]

Perhaps the most important of these for the development of the sector globally is the proposal for increasing technical transfers to developing countries.[156] This could be used to build capacity for biotech development in numerous (including least developed) countries across numerous fields by reducing a key fixed cost when purchasing biotech products and capital, the markup enabled by Intellectual Property Rights (IPRs). However, the asymmetry of the biotech industry (as outlined above) requires a steady expansion of the reach of technical transfers as an integral part of the new accord.

Enable Biotech Capacity by Expanding Technical Transfers in the WHO Pandemic Agreement

As detailed earlier in this section, the low number of IPR transfers remains a persistent challenge to leveraging biotech for development. In its current intergovernmental negotiations (anticipated to be concluded by the Seventy-Eighth World Health Assembly in May 2025), the WHO Pandemic Agreement contextualizes and specifies that voluntary technical transfers should occur with "pandemic-related health products."[157] While this is more ambitious compared to previous discussions or existing instruments, such as the flexibilities afforded by the World Trade Organization's Trade Related Intellectual Property Rights, further ambition is needed for such transfers to fully enable the development of biotech capacity in developing nations.

In other words, there is a need to overshoot transfer agreements in order to, in effect, increase biotech transfers substantially to developing countries, in a global environment and marketplace where inertia for "business-as-usual" practices by multinational pharmaceutical firms remains high. The WHO Pandemic Agreement, now in its final stages of negotiation, should decisively expand the reach of transfers across biotech beyond "pandemic-related" products in its final form, by avoiding a siloed definition of what should be transferred.

Many Intellectual Property Rights for more generic products and processes are currently acting as a roadblock to developing domestic biotech capabilities, such as with long established monoclonal antibodies and their associated therapeutic uses. Nations may be unable to develop pandemic prevention and response capabilities, even with pandemic-related IPRs, if they do not possess IPRs for the generic processes that underpin such capabilities. The COVID-19 pandemic showed that while specific pandemic response capabilities are helpful, it is also essential to possess the capability to deal with unrelated public health challenges that arise from sudden pressures placed on a health system. Enabling the development of broader biotech capacities is, therefore, essential and cannot be achieved through a narrow view of what IPs should be transferred.

Equally, the WHO Pandemic Agreement must remain mindful of the ability of vested interests that may exploit the vague nature of the phrase "pandemic-related health products." Large pharmaceutical companies may narrow this definition considerably to transfer only the most niche products and processes, in order to avoid transferring the more crucial (and commercially lucrative) generics. A clear specification or expansion of the reach of technical transfers in the pandemic accord is thus vital. In preparing for future pandemics, the WHO Pandemic Agreement should heed The Independent Panel for Pandemic Preparedness and Response. It concluded that vaccine procurement and distribution during the COVID-19 pandemic was strongly limited by the World Trade Organization's strict Intellectual Property protection regime for generic pharmaceuticals, backed by powerful WTO Member States.[158]

Establish a More Permanent Negotiating Body for Biotech Transfers

The current (temporary, treaty-focused) Intergovernmental Negotiating Body (INB) of the World Health Organization was set-up in December 2021 to draft and negotiate the proposed WHO Pandemic Agreement.[159] Since its establishment, the INB purports to be guided by the "principle of solidarity" and focuses on practical actions to address the causes and consequences of pandemics and other public health crises.[160]

The current WHO Pandemic Agreement draft negotiating text commits to the use of technical transfers to foster the growth of developing country health industries, including biotech capacity.[161] As displayed in figure 2.6, the biotech sector is growing rapidly and is expected to grow to an estimated market size of U.S. $3.84 trillion by 2030. Beyond its present focus on pandemic prevention, preparedness, and response, the INB could engender important benefits for how this rapidly growing sector contributes to improving equity, health outcomes, and technical capacity in developing countries. However, its effectiveness, as a voluntary mechanism, in promoting biotech transfers more broadly speaking depends on the permanency of this body, the scope of its proposed expanded mandate, and the extent to which developing countries have a seat at the table.

The present Intergovernmental Negotiating Body, while aimed at increasing developing country industrial pharmaceutical capacity, hones in on "pandemic-related products" and reaffirms the right of WTO members to stick by the rights afforded to them in the TRIPS agreement. At the same time, the INB does not offer a clear way for developing countries to play a role in determining the nature of what IPs are transferred nor a space for them to negotiate this. A dedicated and permanent multilateral negotiating body for these discussions is needed.

Consistent with this recommendation, The Independent Panel for Pandemic Preparedness and Response has emphasized the persistent failures of multilateral negotiation forums as key contributors toward the severe difficulties faced by developing countries in responding to COVID-19.[162] By establishing a permanent body with an expanded mandate on biotech transfers, developing countries would be able to better leverage their participation in global markets (and geopolitics too) in a way that they were unable to during the COVID-19 crisis. While ad-hoc collaborations between developing country institutions during the pandemic as described by The Independent Panel wielded some successes, these kinds of fruitful, "win-win" collaborations should be scaled-up and made permanent for broader biotech transfer discussions too.[163] This is especially important considering the power imbalance between developing countries, on one hand, and the advanced industrialized nations where multinational pharmaceutical firms are largely based, on the other.

Upgrading the Intergovernmental Negotiating Body into a permanent multilateral platform with an enhanced mandate and capacities will allow for continuous negotiations on biotech technical transfers and expanded global reach. In particular, this renovated and reimagined mechanism would create clearer guidelines on which pharmaceutical product IPs are eligible for transfer. Furthermore, it should be tasked with recommending amendments to the current WTO's TRIPS agreement, in order to increase the sustainability of all agreed biotech transfers.

Ultimately, this proposal is consistent with Revision 3 of the Pact for the Future.[164] In particular, its Action 31 commits UN Member States to scale-up science, technology, and innovation capacities in developing countries.[165] Specifically, Action 31(c) calls for the support of "open science and open innovation," as well as technology transfers, in order to assist developing countries in achieving the Sustainable Development Goals.[166]

Figure 2.6: Biotechnology Market Size (2023 to 2033 in U.S. $ Trillion)

Source: Nova Advisor. *Biotechnology Market Size, Share & Trend Analysis By Technology, By Application, By Region, And Segment- Global Industry Analysis, Size, Share, Growth, Trends, Regional Outlook, and Forecast 2024-2033*, accessed August 15, 2024.

Bottlenecks and Spoilers

As we have seen through the Summit of the Future negotiations, the general intent (that is, the agreed normative principles) is often much easier to agree on than the recommendations to execute and fully operationalize these newly agreed norms. A huge hurdle to this continues to be the associated financial commitment that comes with large-scale technological (and associated economic and societal) transformations. The 2009 Copenhagen climate conference target of U.S. $100 billion per year for climate action in developing countries has yet to fully materialize, in part due to unrealistic expectations about private sector (green) financing. Furthermore, international organizations, such as the United Nations and African Union, have a tendency to add more to increase their functions, while rarely shedding those that no longer serve an effective purpose.

Overcoming these conundrums requires creative new approaches to both maximizing the financial and other capabilities of all major stakeholders, while rationalizing and encouraging international organizations to lead on tackling global and regional problems where they have a genuine comparative advantage. Focusing on such core principles as inclusion and sustainability, as underscored above, can help to overcome fiscal bottlenecks.

Some multinational private companies today generate more gross profits annually than the Gross Domestic Product of many small countries, in part due to their success in pioneering new technologies with the potential to advance global development. At the same time, many international organizations possess the networks, expertise, and other strengths to facilitate private investments and tech-transfers to the Global South in targeted ways that can mutually benefit both those supplying and receiving cutting-edge technological know-how. Connecting capital and technical expertise and innovation with public objectives will continue to be key to unlocking the promise of technology for more sustainable, just, and equitable futures. This expectation for international cooperation in the development space also holds true on sensitive matters of peace and security, a topic to which we now turn.

III. Governing Technology for Global Peace & Security

> ***"The nature of the threats we face is evolving rapidly: from hybrid or cyber-attacks to the growing arms race in space. Disruptive technology has been a great equaliser in the way power can be used today by rogue states or non-state groups. You no longer need armies and missiles to cause mass damage. You can paralyse industrial plants, city administrations and hospitals – all you need is your laptop. You can disrupt entire elections with a smartphone and an internet connection."***
>
> —Ursula von der Layen, President of the European Commission.[167]

Against the backdrop of heightened geopolitical tensions among the Great Powers and mistrust between the countries of the Global South and Global North, recent technological advances relevant to peace and security merit special attention from international policy-makers and, in many cases new kinds of, or at the very least enhanced, global and regional governance arrangements. This is especially true for artificial intelligence (AI) and other cyber-technologies, weapons of mass destruction (WMD), and the significant mineral requirements of new and complex military technologies. Of heightened concern is how tech innovation, simultaneously, generates dangerous new threats and dangerous new governance vacuums; this, in turn, creates new forms of global insecurity.

Challenges explored in this section include the risks for global security and human rights when the integration of AI into military technologies reduces human decision-making involvement and even oversight; how technological change affects prospects for WMD proliferation; and the connection between mineral resource extraction in fragile states and the potential for recurring violence and corruption. Drawing upon five mutually-reinforcing tech-governance principles, the section introduces six policy innovations in AI and other cybertech, WMD, and minerals for military and other high technology. The section also relates these ideas to this September's Summit of the Future and the anticipated adoption of a new UN Global Digital Compact.

Major Challenges, Risks, and Opportunities

Amidst the highest number of armed conflicts since 1946, military technologies are evolving rapidly in both damage potential and distribution.[168] While some technological developments advance opportunities for safeguarding civilians in conflict and for human rights monitoring, many pose significant risks not only to lives and liberty, but to the controllability of conflict itself.[169] Artificial Intelligence is expanding the autonomous capabilities of weapons and accelerating the spread of digital dis- and misinformation,

which now tops the *Global Risks Report 2024's* list of biggest short-term risks.[170] Large-scale cyber-attacks have become more prominent as data of all kinds is both digitized and uploaded to globally connected servers at scales ranging from personal to industrial. Digital development and testing, alongside the rapid evolution of robotics, are challenging efforts to curb the proliferation of weapons of mass destruction and to address the implications of diminished human influence over critical military operational decisions. Meanwhile, the race for key mineral resources, which supports both military and non-military advanced technologies, is set against a backdrop of high geopolitical tensions and raises serious questions of equity, exploitation, and environmental damage.[171]

ARTIFICIAL INTELLIGENCE AND OTHER CYBER-TECHNOLOGIES

AI is an emergent technology whose potential is increasing rapidly but remains as yet not fully defined. In its application to operational military technology, a key potential value—as well as a chief concern—is the extent to which AI can reduce the need for human presence at the "tip of the spear," reducing own-side casualties, but with corresponding concern about reducing human decision input and oversight and blurring lines of accountability in lethal weapons use.[172] The market for such "lethal autonomous weapon systems" (LAWS) includes drone and counter-drone technologies (which use AI to detect and jam or destroy drones on the battlefield).[173] China and the United States are currently the largest spenders on defense software and artificial intelligence/machine learning (AI/ML).[174]

AI can assist non-state actors in gathering knowledge about biochemical weapons and other intricate weapon technology.[175] In 2023, there were also approximately 317 million ransomware attacks worldwide, mostly executed by cybergangs and hackers that targeted governmental information systems, in particular healthcare systems.[176]

AI is an emergent technology whose potential is increasing rapidly but remains as yet not fully defined. In its application to operational military technology, a key potential value—as well as a chief concern—is the extent to which AI can reduce the need for human presence at the "tip of the spear," reducing own-side casualties, but with corresponding concern about reducing human decision input and oversight and blurring lines of accountability in lethal weapons use.

Both the potential good and the potential harm that AI and other cyber-technologies promise, and their nearly inherent global reach, make the governance of these technologies a global issue. So does the considerable gap between cyber capacities of private Big Tech and those of the public sector in much of the world.[177] The UN Secretary-General's recently created Advisory Board on AI's *Interim Report: Governing AI for Humanity* highlights the need for a multistakeholder approach to AI governance that emphasizes equal access for Global South actors and cooperation with the private sector.[178]

Secretary-General Guterres has also established an inter-agency working group on AI and a task force to analyze and consider new kinds of global governance responses to the challenges and opportunities presented by AI.[179] The third revision of the draft Global Digital Compact (GDC) emphasizes the need to govern AI globally and to strengthen cyber-security in the non-military domain.[180] The Organization

for Economic Cooperation and Development (OECD) has also instituted a Working Party and Network of Experts on AI,[181] and the European Union proposed recently the first EU AI Act for addressing different AI risk levels.[182] China's updated guidelines on generative AI require firms to register products and undergo a security review before release, while the African Union's "Digital Transformation Strategy 2020-2030" and "Africa Agenda 2063" strengthen data, stimulate innovation, and facilitate the interoperability of systems.[183]

Meanwhile, and perhaps most ambitiously, in a July 2023 address to the Security Council, Secretary-General Guterres welcomed calls for a new United Nations entity to support collective AI governance, inspired by the International Atomic Energy Agency (IAEA) and other models.[184] Such an International Artificial Intelligence Agency (or "IA2," as it was branded in the *Future of International Cooperation Report 2023*) presents an opportunity to include all states in the AI governance policy-making process and to connect the expertise of diverse private sector and civil society actors in defining and responding to AI-related threats.[185] Given that the International Energy Agency anticipates that AI-driven global data centers will demand ever-greater levels of electricity, the environmental implications of AI-related technologies also merit urgent public policy attention.[186]

In 2016, the Fifth Review Conference of the signatories to the Convention on Certain Conventional Weapons (CCW) established a Group of Governmental Experts (GGE) on Lethal Autonomous Weapon Systems,[187] which has convened each year since then to discuss governance of LAWs, with a view to updating the CCW and filling a major global governance gap in international humanitarian law (IHL).[188] In July 2023, the UN Secretary-General went further and proposed, in his *New Agenda for Peace*:

> ***"building on the progress made in multilateral negotiations, [to] conclude, by 2026, a legally binding instrument to prohibit lethal autonomous weapon systems that function without human control or oversight, and which cannot be used in compliance with international humanitarian law, and to regulate all other types of autonomous weapon systems."***[189]

Governance of cyber-security within the ambit of the UN Security Council has otherwise focused mostly on cyber-terrorism, reflecting growing concerns about defending against large-scale cyber-attacks.[190] In Geneva, the International Telecommunications Union (ITU) plays a major role in international cyber-governance standard setting, but its decision-making of late has grown increasingly politicized, due especially to tensions between the U.S. and Russia.[191] Furthermore, regional attempts to govern cyber-security include the recent EU Directive 2022/2555, which protects cyber-security infrastructure involving transport, energy, healthcare systems, and digital spaces.[192]

WEAPONS OF MASS DESTRUCTION

Nine countries today possess nuclear arms. While the global inventory of those weapons declined markedly after the Cold War in the wake of U.S.-Russia arms control accords, the number of warheads in other states' stockpiles has been slowly increasing.[193] The Nuclear Non-Proliferation Treaty (NPT, 1970) is the principal bulwark against the spread of nuclear arms, buttressed by the onsite inspection capacities

of the International Atomic Energy Agency. The Comprehensive Nuclear-Test-Ban Treaty (CTBT, 1996) bans explosive nuclear weapon tests; however, it does not regulate computer simulations used to model nuclear explosions.[194]

Biological and chemical weapons have been banned under the Biological Weapons Convention (BWC, 1975) and the Chemical Weapons Convention (CWC, 1997), while the earlier Geneva Protocol (1928) prohibited the use of chemical or biological weapons in international armed conflict.[195] Nonetheless, the Syrian Government is widely considered to have used chemical weapons on its own population.[196] Research using Large Language Models (LLMs) has also shown their potential to assist in planning and refining bio-weapon-related attacks.[197]

> ***As the threat of emerging chemical weapons will not disappear, the OPCW will need to regularly revisit its treaty and integrate changes as necessary, including in response to the potential impact of AI and broader cyber-technologies on the chemical weapons governance regime.***

Notably, no governance arrangement—at global or regional levels—currently addresses the computational testing of nuclear weapons. But certain regional arrangements display varying levels of successful WMD governance, such as the Treaty of Tlatelolco in Latin America (establishing a nuclear-weapon-free-zone) and the EU's Chemical, Biological, Radiological, and Nuclear (CBRN) Risk Mitigation Centres of Excellence Initiative, providing response-training to CBRN threats.

The Organization for the Prohibition of Chemical Weapons (OPCW) has effectively coordinated the destruction of the last known declared stockpiles of chemical weapons.[198] However, as the threat of emerging chemical weapons will not disappear, the OPCW will need to regularly revisit its treaty and integrate changes as necessary, including in response to the potential impact of AI and broader cyber-technologies on the chemical weapons governance regime.

The BWC "prohibits the development, production, acquisition, transfer, stockpiling and use of biological and toxin weapons." However, it continues to lack sufficient verification mechanisms to ensure full compliance among the convention's parties.[199] The treaty also requires upgrading to address genetic engineering risks, specifically by prohibiting the creation of biological agents as weapons of war.

MINERAL RESOURCES FOR ADVANCED TECHNOLOGIES

A wide range of minerals—some rare, and some found mostly in a handful of countries—are essential for the production and functioning of many advanced technologies, both civilian and military (including massively growing mineral needs for AI compute semiconductors). Nuclear deterrence strategies and human rights and relief organizations alike depend on satellite technology—for missile early warning, communications, Intelligence, Surveillance, and Reconnaissance (ISR), and to investigate crimes or survey flooding in inaccessible or conflict-affected areas, respectively—that, in turn, requires a wide range of mineral inputs, some common, many exotic.[200] Table 3.1 offers a partial list of such "critical" minerals—as periodically compiled by the U.S. Geological Survey—and some of their common uses.

Table 3.1: Select Minerals with Significant Clean Energy Transition, Electronic, and/or Military Applications

Beryllium	used as an alloying agent in aerospace and defense industries
Cerium	used in catalytic converters, ceramics, glass, metallurgy, and polishing compounds
Cobalt	used in rechargeable batteries and superalloys
Dysprosium	used in permanent magnets, data storage devices, and lasers
Erbium	used in fiber optics, optical amplifiers, lasers, and glass colorants
Europium	used in phosphors and nuclear control rods
Gadolinium	used in medical imaging, permanent magnets, and steelmaking
Gallium	used for integrated circuits and optical devices like LEDs
Germanium	used for fiber optics and night vision applications
Graphite	used for lubricants, batteries, and fuel cells
Hafnium	used for nuclear control rods, alloys, and high-temperature ceramics
Holmium	used in permanent magnets, nuclear control rods, and lasers
Indium	used in liquid crystal display screens
Iridium	used as coating of anodes for electrochemical processes and as a chemical catalyst
Lanthanum	used to produce catalysts, and in metallurgy and batteries
Lithium	used for rechargeable batteries
Lutetium	used in scintillators for medical imaging, electronics, and some cancer therapies
Manganese	used in steelmaking and batteries
Neodymium	used in permanent magnets, rubber catalysts, and in medical and industrial lasers
Nickel	used to make stainless steel, superalloys, and rechargeable batteries
Palladium	used in catalytic converters and as a catalyst agent
Praseodymium	used in permanent magnets, batteries, aerospace alloys, ceramics, and colorants
Rhodium	used in catalytic converters, electrical components, and as a catalyst
Rubidium	used for research and development in electronics
Ruthenium	used as catalysts, as well as electrical contacts and chip resistors in computers
Samarium	used in permanent magnets and as an absorber in nuclear reactors
Scandium	used for alloys, ceramics, and fuel cells
Tantalum	used in electronic components, mostly capacitors and in superalloys
Tellurium	used in solar cells, thermoelectric devices, and as alloying additive
Terbium	used in permanent magnets, fiber optics, lasers, and solid-state devices
Thulium	used in various metal alloys and in lasers
Ytterbium	used for catalysts, scintillometers, lasers, and metallurgy
Yttrium	used for ceramic, catalysts, lasers, metallurgy, and phosphors

Source: Original Table, Stimson Center. Data source: Burton, "U.S. Geological Survey Releases 2022 List of Critical Minerals." Accessed August 29, 2024.

Critical minerals are unevenly distributed over the earth. China, for example, controls the majority of supply chains for copper, lithium, nickel, graphite, and cobalt, essential inputs for clean energy technologies.[201] Many countries are also dependent on Russia's Rosatom Corporation, which oversees international uranium mining activities.[202]

Minerals access is also influenced by geopolitical tensions as countries and big tech corporations, primarily from the Global North, compete for resources in mineral-rich countries in the Global South.[203] Limited governance of mineral markets (whether globally, regionally, nationally, or sub-nationally) has produced inequities in mineral-rich African and Latin American countries, whose citizens often do not reap the benefits of their natural resources and are subject to societal disruptions and human rights violations.[204] Seventy percent of cobalt, for example, exists in the Democratic Republic of the Congo, a country rife with internal conflict and illicit resource exploitation.[205] Indeed, many mineral-rich countries are fragile states, plagued by recurring violence and corruption, both worsened by poor resource-management.[206]

The environmental governance of uranium has been more successful; the management of uranium's environmental impact, waste, as well as socioeconomic benefits for local communities exhibits opportunities for the effective management of other minerals.[207] Moreover, organizations such as the Nuclear Suppliers Group provide guidelines to nuclear-related products supplier countries seeking to uphold agreed non-proliferation norms which can, in turn, be applied to other minerals.[208]

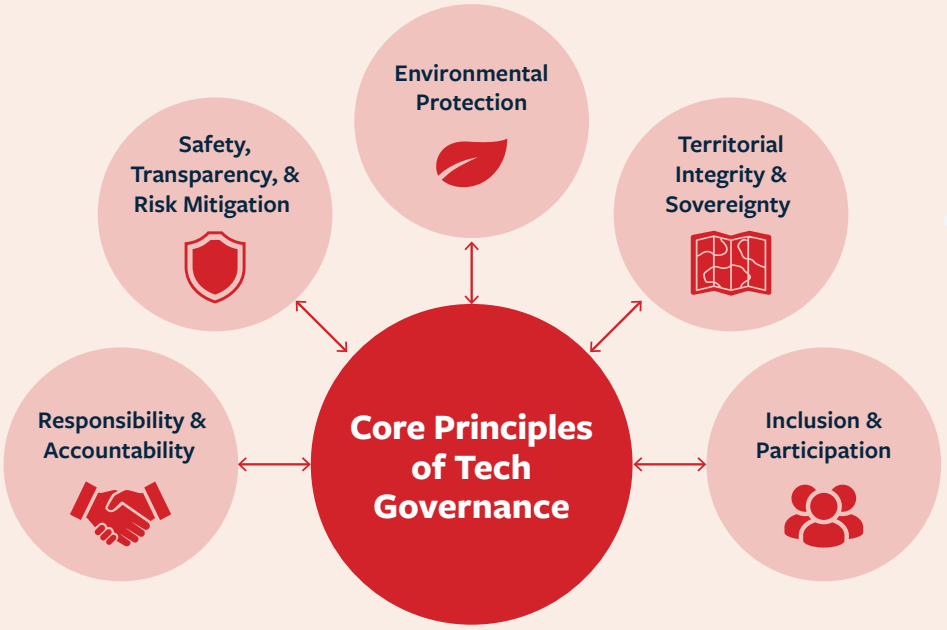
Revisiting Core Principles

The *Future of International Cooperation Report 2023* underscored the core principles of Safety, Sustainability, and Inclusion ("SSI"), which together provide a critical foundation for addressing the tech-governance challenges of artificial intelligence, weapons of mass destruction, and the mining, refining, and use of uranium, rare earth elements (REEs), and other critical minerals.[209] Here we introduce five closely related conceptual clusters of principles (figure 3.1): 1. Safety, Transparency, and Risk Mitigation, 2. Responsibility and Accountability, 3. Inclusion and Participation, 4. Territorial Integrity and Sovereignty, and 5. Environmental Protection. Collectively, they seek to innovate the peaceful and safe governance of technology, including digitalization.

> ***Robust approaches to accountability and inclusive participation by diverse stakeholders can ensure greater safety, transparency, and the protection of human rights when deploying advanced AI to military applications.***

Robust approaches to accountability and inclusive participation by diverse stakeholders can ensure greater safety, transparency, and the protection of human rights when deploying advanced AI to military applications.[210] A responsible, safe, and secure international community also depends on strong accountability mechanisms and transparent procedures to prevent WMD proliferation, as manifested in the international supervision of Iran's nuclear program, as well as governance measures that uphold environmental protections and respect national sovereignty.[211] Similarly, the mining of minerals essential to high-tech applications should entail strict environmental protection protocols and responsible management to prevent, halt, and reverse ecological degradation, while safeguarding the rights of local communities where the mines are located. Useful cases could include assessing the environmental impact of China's significant role in the global supply chain of minerals mined from such fragile and conflict-affected countries as Myanmar.[212]

Figure 3.1: Core Principles on Governing Tech for Peace & Security



Source: Original Figure, Stimson Center.

SAFETY, TRANSPARENCY, AND RISK MITIGATION

Every UN Member State must protect and ensure the safety of their citizens and differentiate between combatants and civilians during war.[213] New war technologies, such as hypersonic missiles that can carry either nuclear or conventional warheads, shorten the time in which the targeted party can react to an attack, placing civilians at immense risk.[214] Transparency is crucial in creating AI algorithms that support trust-building between states in the field of international security; this includes allowing for a comprehensive inspection of how AI tools are trained.[215] Finally, risk mitigation entails placing or maintaining restrictions on the development and deployment of WMD, and an emphasis on human and environmental safety in connection with military technological advances. Risk mitigation measures are also critical in the mining and manufacturing of uranium and other minerals and materials essential for high-tech applications, including of a military nature.

RESPONSIBILITY AND ACCOUNTABILITY

A strong global regime addressing the military use of digital technologies should promote interstate accountability and legal responsibility through new rules on their development and use.[216] New technologies present the United Nations with both the challenge and opportunity of evaluating state accountability, while fostering responsible state behavior by enforcing the consequences of legal violations.[217] Upholding the principles of responsibility and accountability in tech-governance also implies that states are committed to the well-being of both their citizens and the natural environment.

INCLUSION AND PARTICIPATION

The quality of multilateral decision-making (including the level of inclusion) is frequently discussed and critiqued, and it serves as a major factor in establishing and maintaining global narratives, guidelines, and cooperation essential for sustaining peace.[218] As long as only big and militarily powerful countries are invited to make tech-governance decisions pertaining to AI, WMD, and critical minerals, frustration will grow among smaller countries that feel left out.[219] Inclusive and participatory decision-making on the governance of these technologies and their material inputs can work to redress global power imbalances, build a stronger global consensus around new norms and (over time) laws, and help to ensure adequate attention to human rights.[220]

TERRITORIAL INTEGRITY AND SOVEREIGNTY

Territorial integrity and sovereignty are principles enshrined in the UN Charter in stating that "all Members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the Purposes of the United Nations."[221] How they are conceptualized, though, needs updating in the modern age, including by accounting, simultaneously, for the digital safety of international civil servants and independent journalists.[222] Digital attacks on critical infrastructure pose a further threat to personal safety, territorial integrity, and political independence.[223] States also must be reminded of their legal commitments toward the peaceful use of outer space, as reflected in the Outer Space Treaty of 1967.[224] In that agreement, the United Nations identified outer space as a place for technological development, scientific research, and other peaceful uses.[225]

ENVIRONMENTAL PROTECTION

Climate Protection is critical to global peace too, as it addresses topics of fair distribution of resources, consequences of natural disasters, and (un-) voluntary migration.[226] Preventing climate change from developing into a global catastrophe means moderation in and effective governance of the use of natural resources. Uranium, rare earth elements, and critical minerals are crucial for the development of military and other advanced technologies, but their overexploitation and poorly managed development can severely harm people and the planet.[227] A crucial element of effective climate and environmental protection involves the empowerment of women and girls, as well as their education in technology and digitalization.[228]

Global and Regional Governance Innovations for Delivering Results

Improvements in global and regional governance for peace and security—for the direct benefit of all peoples and countries—typically take the form of institutional, legal, policy, normative, and operational changes in the international system. Drawing upon the five principles above, and given the peace and security challenges, risks, and opportunities stemming from current and emerging technologies, six global and regional governance innovations are introduced below. Each recommendation—with two across AI and cybertech, weapons of mass destruction, and minerals for military technology, respectively—focuses on reforms aimed at developing new or enhanced instruments and capacities for improving conditions for global security and preventing the outbreak and recurrence of violent conflict.

AI AND CYBERTECH GOVERNANCE INNOVATIONS FOR SAFETY & SECURITY

New technologies have given rise to a variety of new methods of warfare, including lethal autonomous weapon systems, cyber-attacks, and the militarization of facial recognition software, to name a few. The malevolent use of AI and broader cyber domain technologies by nefarious state and non-state actors not only challenges the traditional understanding of state sovereignty, but it poses considerable risk to the livelihoods and security of individuals and communities, including both mental and physical harm.[229]

In response to these and related global challenges and opportunities in the emerging AI and cybertech space, two new global governance innovations are introduced below for enhanced global safety and security, namely a Lethal Autonomous Weapon Systems Treaty and an International Artificial Intelligence Agency. In addition to shaping follow-through to this September's Summit of the Future (including the full realization of commitments made in the summit's Global Digital Compact), the ideas presented are poised to inform this November's G20 Summit Rio de Janeiro Declaration and outcomes generated at the February 2025 AI Action Summit in Paris.

Adopt a New Lethal Autonomous Weapon Systems (LAWS) Treaty

The rapid development of technologies, such as artificial intelligence and AI-controlled lethal autonomous weapons, pose unique threats to global governance in the peace and security domain, by making warfare more deadly and efficient—and autonomous. They further risk civilian casualties and racial profiling. A legally binding treaty on autonomous weapon systems is urgently needed to maintain meaningful human control over the use of force and life-or-death decisions. The UN General Assembly provides a suitable forum to negotiate such a treaty, beginning with the introduction of a resolution through the Assembly's First Committee on Disarmament and International Security, building on the work of the Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems.

Fortunately, citing concerns about the potential risks to international peace and security, Rev. 3 of the Pact for the Future recommends in Action 29: "We will address the potential risks posed by the misuse of digital technologies, including information and communication technologies and artificial intelligence."[230] Through Rev. 3 (Action 29), UN Member States further seek to: "(d) Identify and address the existing and potential risks associated with the military applications of artificial intelligence and ways to harness the opportunities throughout their lifecycle, in consultation with relevant stakeholders."[231]

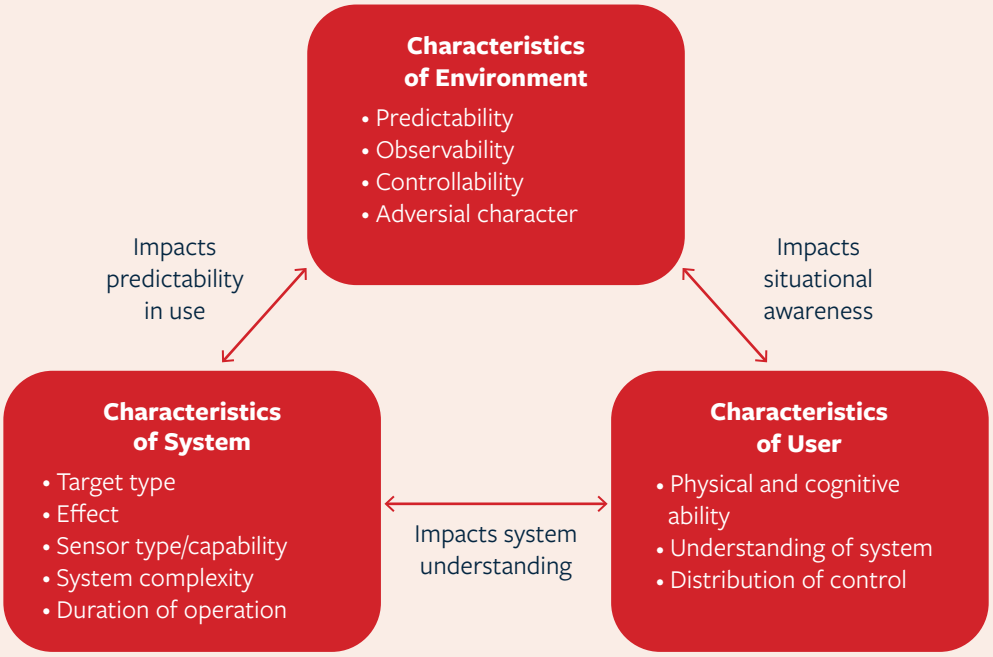
At the same time, the earlier Rev. 1 (Action 24), more explicitly called for "(c) Request[ing] the Secretary-General to present options for Member State consideration for a potential multilateral accountability mechanism to support adherence to agreed norms, rules and principles of responsible State behaviour."[232] Furthermore, and in connection with the Secretary-General's call in his July 2023 *A New Agenda for Peace* for completing negotiations, by 2026, of the LAWS Treaty, the even earlier "Zero Draft" of the Pact proclaimed "We also commit to developing norms, rules and principles on the design, development and use of military applications of artificial intelligence through a multilateral process, while also ensuring engagement with stakeholders from industry, academia, civil society and other sectors."[233]

The use of autonomous weapon systems, which can identify and attack targets without direct human intervention, raises considerable moral and ethical implications for tech-governance in the peace and

security space. Since such weapons challenge established rules and regulations, an international advisory board is needed that brings together experts in humanitarian law and rules of engagement, military ethicists, and technical experts, as well as religious and interfaith leaders, to explore the implications for warfare from lethal autonomous weapons. Earlier, the Alliance for Multilateralism offered eleven guiding principles to place Autonomous Weapon Systems under the umbrella of international humanitarian law and to safeguard these new technologies from falling into non-state hands.[234]

Several organizations and individuals additionally hold the view that human control must be maintained over weapon systems to guarantee compliance with international law.[235] Much like the prohibitions against landmines and biochemical weapons, countries must adopt norms that constrain the autonomy and automatization of weapons systems. The international community should propose rulings that limit the targets of lethal autonomous weapons to those of similar uncrewed but remotely piloted weapon systems. As a precursor to hopefully adopting soon a new Lethal Autonomous Weapon Systems Treaty, the UN General Assembly's resolution, on December 22, 2023, represents an important step forward.[236] It underscores the potential dangers of LAWS, how the UN Charter and international humanitarian law apply to LAWs (see also figure 3.2), and mandates a new report to the General Assembly, by September 2024, that gathers inputs from countries and other stakeholders to address these concerns.

Figure 3.2: Compliance with IHL in the Development and Use of Autonomous Weapon Systems



Source: Bruun, Bo, and Goussac, *Compliance with International Humanitarian Law in the Development and Use of Autonomous Weapon Systems: What does IHL Permit, Prohibit and Require?*, 14.

Create an International Artificial Intelligence Agency (IA2)

In June 2023, UN Secretary-General António Guterres suggested modeling a new UN Office of AI on the International Atomic Energy Agency (IAEA), which holds regulatory powers.[237] As also referenced in section two (and building on the *Future of International Cooperation Report 2023*), this report proposes the creation of an International Artificial Intelligence Agency modeled on the IAEA to provide it with the agility, capacity, and coordination authority that a small office in the UN Secretariat may not possess. The agency would serve to: i) improve visibility, advocacy, and resource mobilization for global AI regulatory efforts, capacity-building, and expanded access; ii) provide thought leadership on General Assembly, Security Council, World Trade Organization, and G20 AI and cyber-technology-related initiatives and agreements; iii) monitor, evaluate, and report on AI industry safeguards and AI compute, including through establishing an AI Chip Registry; iv) enhance coordination across Member States, the World Trade Organization, G20, and regional bodies to leverage AI's positive development applications; and v) coordinate transnationally across initiatives and frameworks on AI governance to support knowledge-sharing of best practices and lessons learned.

It is worth noting here where the capacity of an IA2 would diverge from the IAEA. The IAEA oversees and monitors physical products with radiation signatures and facilities into which monitors, sensors, and cameras can be placed to enable offsite tracking. Even if this monitoring capacity is blocked, it is usually known that this blocking has happened.[238] Additionally, the IAEA mandate clearly falls into both safe use and non-proliferation, the latter of which for AI entails much more gray area and debate.

The International Artificial Intelligence Agency could help countries to combat AI-enabled disinformation and the resulting misinformation that can fuel violence and aid terrorist and criminal organizations. Three new instruments that could aid the IA2 and UN Member States in this important role are: i) The General Assembly's landmark resolution, on March 11, 2024, on "Seizing the opportunities of safe, secure and trustworthy artificial intelligence systems for sustainable development;"[239] ii) the Secretary-General's launch, on June 24, 2024, of five new UN Global Principles for Information Integrity;[240] and iii) the soon-to-be adopted Global Digital Compact (especially its focus on "Information Integrity" commitments in paras. 32-35).[241]

Additionally, in late 2024, following five-years of negotiations, the General Assembly is also expected to adopt the first global legally binding instrument on cybercrime.[242] The new cybercrime convention will provide tools to enhance international cooperation in fighting technology-enabled crimes, from terrorism to drug trafficking to trafficking in persons, migrant smuggling, firearms trafficking, and more.

The IA2 would also be tasked with governing and regulating technology without a clear physical marker, and for instance, knowing whether AI is developed without clear principles (such as those recommended in this report) and outside of a global regulatory framework is that much more difficult to track. Moreover, the IA2 requires especially strong knowledge management capacity to both liaise effectively with relevant stakeholders, as well as develop the global regulatory framework as technology evolves. Finally, the newly proposed agency must tackle the "black-box problem" of AI making decisions on input data that humans do not entirely understand, only to see the output in the end.

In other words, the International Artificial Intelligence Agency would need to operate at a high enough level to maintain credibility and normative legitimacy, while also reaching down far enough to monitor the checks and balances placed on AI and its often opaque operations—at the same time avoiding operational over-reach.[243] This vast, and simultaneously deep, functionality would benefit from both a body tasked

solely with providing technical support to inform such functions, as well as a new international public-private partnership for expanding access to or funding innovation in AI technology from leading AI developers: an Independent International Scientific Panel on AI and a Frontier AI Collaborative, respectively (see section two for details on both).

TECH-GOVERNANCE AND WMD

The rapid pace of technological advancements poses new challenges to the global governance of weapons of mass destruction. While international law heavily regulates WMD through treaties like the Chemical Weapons Convention and the Biological Weapons Convention,[244] technologies such as AI, blockchain, and other cyber-related capabilities are not only creating new pathways for potential WMD acquisition, but they are also reshaping the landscape of monitoring and compliance.[245] AI, for instance, impacts nuclear proliferation by affecting command and control, missile delivery systems, conventional counterforce operations, early warning, and Intelligence, Surveillance, and Reconnaissance (ISR).[246] Existing governance structures, while robust in their foundational principles, often lack the agility to address the fast-evolving technological landscape. These developments require a balance between global and regional governance, as well as structures that can adapt more swiftly and effectively to mitigate emerging risks associated with these new technologies.[247]

In this context, the Summit of the Future and related (long-standing) international policy-making present a critical opportunity to strengthen the global governance of WMD nonproliferation. The recent creation of ImPact Coalitions in support of the summit and its follow-through underscores civil society's role in driving change, including vis-à-vis arms control and security frameworks. In alignment with the principles outlined in the summit's Pact for the Future chief outcome document, the international community must ensure that the governance of emerging technologies, including vis-à-vis WMD, adheres to the rule of law and agreed norms.[248] More specifically, the summit's commitment to National Prevention Strategies and the new Global Digital Compact could evolve, over time, to address both traditional and emerging WMD threats, ensuring a more holistic approach to global security.[249]

At the same time, it is crucial not to overlook the long-standing issues associated with nuclear weapons testing. The United Nations has called for an end to nuclear testing as a significant step toward preventing the further proliferation of nuclear weapons and promoting global disarmament. On the International Day Against Nuclear Tests, Secretary-General António Guterres emphasized the devastating consequences of nuclear testing on human health and the environment, urging all nations to achieve the universalization of the Comprehensive Nuclear-Test-Ban Treaty (CTBT) as a vital component of this broader security framework.[250]

Strengthen WMD Global Regulatory Frameworks and Tech-Governance Collaboration

A robust multilateral regulatory system is essential to both manage and harness the intricacies arising from advancements in technology. Regulatory approaches should exhibit adaptability and responsiveness to emerging technological developments and breakthroughs.[251] While emerging technologies can create new acquisition pathways for weapons, they can also enhance existing WMD treaties by making inspections more effective and resource management more efficient. Integrating the latest technologies into a multilateral regulatory system requires time and coordinated efforts, in a manner that is cognizant of both the geopolitical context and financial requirements assumed collectively by governments.[252]

For example, emerging technologies like blockchain, as highlighted by the Stimson Center's Monitoring and Tracking Chemicals (MATCH) project and elaborated below, provide a promising technical solution for enhancing the tracking and monitoring of the trade in chemicals covered by the Chemical Weapons Convention (CWC). By creating transparent and immutable records, blockchain can help to prevent these materials from falling into the wrong hands, thereby strengthening global WMD governance.[253] Additionally, the integration of blockchain technology must be coordinated across international bodies like the OPCW and IAEA, as well as regional and national entities, to ensure consistent and secure tracking of WMD-related materials. NATO has further recognized the importance of this technology and is actively promoting its integration into arms control frameworks across its Member States and partners, particularly in regions where monitoring and governance are critical to prevent the escalation of regional tensions.

Technological Progress, Regulatory Adaptation, and Compliance

With advancements in AI, additive manufacturing, and synthetic bio, it is vital that regulatory mechanisms evolve accordingly. To ensure the effective enforcement of international treaties, such as the Chemical Weapons Convention (CWC), the Biological Weapons Convention (BWC), and the Treaty on the Non-Proliferation of Nuclear Weapons, periodic revisions should incorporate mechanisms, such as routine inspection cycles, transparent reporting procedures, and penalties for violations, to keep pace with new WMD-related technologies.[254] The OPCW's Scientific Advisory Board, for instance, has been instrumental in identifying and informing States Parties about emerging technologies and new risks, helping to ensure that these technologies can be integrated into chemical weapons detection and governance, thereby maintaining the CWC's relevance in an evolving threat landscape.[255]

However, the implementation of these advancements is ultimately determined by the States Parties. Technological advancements can help to facilitate and streamline reporting and inspection efforts within organizations like the OPCW, Implementation Support Unit (ISU), and IAEA, ensuring that each organization can effectively integrate emerging technologies into its specific area of WMD governance. Simultaneously, these regulatory and compliance tools should employ the latest technological innovations for improved WMD detection and broader areas of WMD governance (see below).[256]

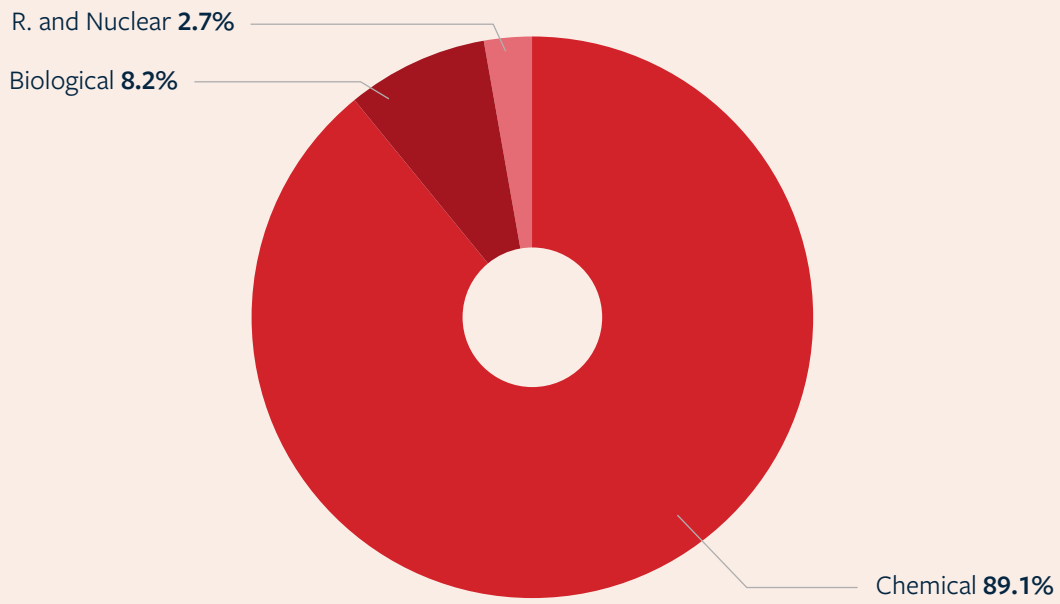
The Organisation for the Prohibition of Chemical Weapons, with a strong intergovernmental mandate and associated capabilities for monitoring, inspecting, and verifying the destruction of chemical weapons, demonstrates how an international organization can effectively integrate emerging technologies into its mandate.[257] Similarly, the Biological Weapons Convention Implementation Support Unit plays a crucial role in facilitating discussions on technological developments and ensuring compliance with the BWC.[258] Rather than expanding their formal mandates, these organizations focus on enhancing their existing tools and approaches to stay ahead of emerging technological threats. Improved approaches to WMD transparency that adopt comprehensive reporting and other verification measures can establish greater trust among nations, reducing the likelihood of non-compliance in fulfilling international treaty obligations.[259]

Leverage Emerging Technologies for Detection and Defense

Emerging technologies hold tremendous potential in strengthening detection and defense capabilities against the threat of weapons of mass destruction. Blockchain, as noted earlier, can create immutable,

transparent records of transactions and the movement of sensitive materials, thereby enhancing the monitoring and control capacities of WMD governance.[260] Blockchain powers real-time tracking of potentially dangerous materials. Its integration into existing multilateral regulatory systems, such as those for nuclear weapons (e.g., NPT, IAEA Safeguards Agreements), chemical weapons (CWC), and efforts related to biological weapons (though the BWC lacks a verification regime), not only improves monitoring and control capacities, but it also helps to harden WMD global governance by ensuring that hazardous materials are safely and responsibly managed and tracked—to prevent these devastating weapons from falling into the wrong hands.[261] According to the Global Terrorism Database, since 1970, terrorist organizations have used or attempted to use biological, chemical, radiological, and nuclear materials to produce and deploy weapons of mass destruction (see figure 3.3).[262]

Figure 3.3: Number of Biological, Chemical, Radiological, and Nuclear Attacks from 1970 to 2019



Source: Briglia, "Nuove Tecnologie e Armi di Distruzione di Massa: Verso un Nuovo Terrorismo," *Il Grand Continent*.

Moreover, blockchain can be used to facilitate the traceability of dual-use items in real time, ensuring that materials and technologies that can be used for both military and civilian purposes are effectively monitored.[263] Additionally, given its tamper-proof and immutable nature, blockchain ensures that procurement-related documents cannot be manipulated, which, in turn, could deter corrupt practices.[264] As highlighted by the Second NPT PrepCom (July 22–August 22, 2024 in Geneva), reaffirming the commitment to non-proliferation and risk reduction through collaborative international efforts is crucial.

Strengthening these commitments, particularly among nuclear-weapon states, will prevent escalation and promote stability in arms control agreements.[265]

Fostering Greater Global Collaboration

An effective multilateral regulatory framework in the peace and security space can reflect a high-level of global cooperation and, over time, even a degree of trust among major military powers.[266] The IAEA, through initiatives like its Emerging Technologies Workshop, has been instrumental in fostering such collaboration, particularly by addressing the challenges posed by new technological developments.[267] Regional bodies like the African Union and Association of Southeast Asian Nations (ASEAN) also play a crucial role in complementing international efforts by tailoring WMD governance to regional contexts, as seen in their cooperative exercises and information-sharing agreements. These efforts are crucial in ensuring that technological advances are harnessed to strengthen global security rather than exacerbate proliferation risks.

Notably, the First Committee at the United Nations handles Disarmament and International Security, providing a platform for discussions and initiatives aimed at reducing WMD threats. The IAEA, on the other hand, facilitates collaboration specifically among Member States, focusing on nuclear security and safeguards.[268] These organizations, within their respective mandates, can contribute to broader efforts to strengthen defenses against WMD misuse and accidents by promoting shared intelligence, research findings, and best practices.

While the expansion of intelligence-sharing platforms globally may be limited due to the lack of mandates and willingness among States Parties, such collaboration could become more feasible among allied or like-minded nations. However, even within close affinity groups like the Nuclear Suppliers Group (NSG), challenges exist, especially with the inclusion of new members, which can complicate intelligence-sharing efforts.

Enhance WMD Regional Tech-Governance and Develop Capacity for Innovation and Safety

Though not a substitute for global efforts, regional cooperation has provided focused attention and timely responses to the dangers posed by weapons of mass destruction.[269] Perhaps best captured by the notion of "cooperation under the security dilemma," evidence suggests that in some regions today the taboos associated with nuclear weapons appear to be weakening, while the perception of prestige and security benefits is on the rise.[270] Steady advances in technology bring not only the danger of new weapons in the hands of new (potentially bad) actors, but also a new context in which proliferation will occur.[271] Fortunately, innovations in regional tech-governance in the peace and security space, including joint security initiatives and regional non-proliferation agreements, can further enhance security and build trust among neighboring states.[272]

Enhancing Regional Arms Control Agreements and Cross-Border Security Mechanisms

Regional arms control agreements can be effective if tailored to specific regional needs and threats (figure 3.4). For instance, the Treaty of Tlatelolco successfully established a nuclear-weapon-free zone

across Latin America.[273] Somewhat identical agreements are desirable and strongly encouraged for other regions and in respect to both nuclear and non-nuclear WMD. In the Middle East, the idea of a WMD-free zone has been discussed for many years, but while never fully realized, progress was made during a 2019 United Nations-sponsored conference. This convening is credited with reducing tensions and fostering peace across the region.[274]

Moreover, regional cross-border security mechanisms that employ new technologies are crucial to ensure quick detection and an effective, coordinated response to emerging threats. For example, the use of drones equipped with sensors for chemical detection has been explored by several regional security initiatives, including the European Defence Agency.

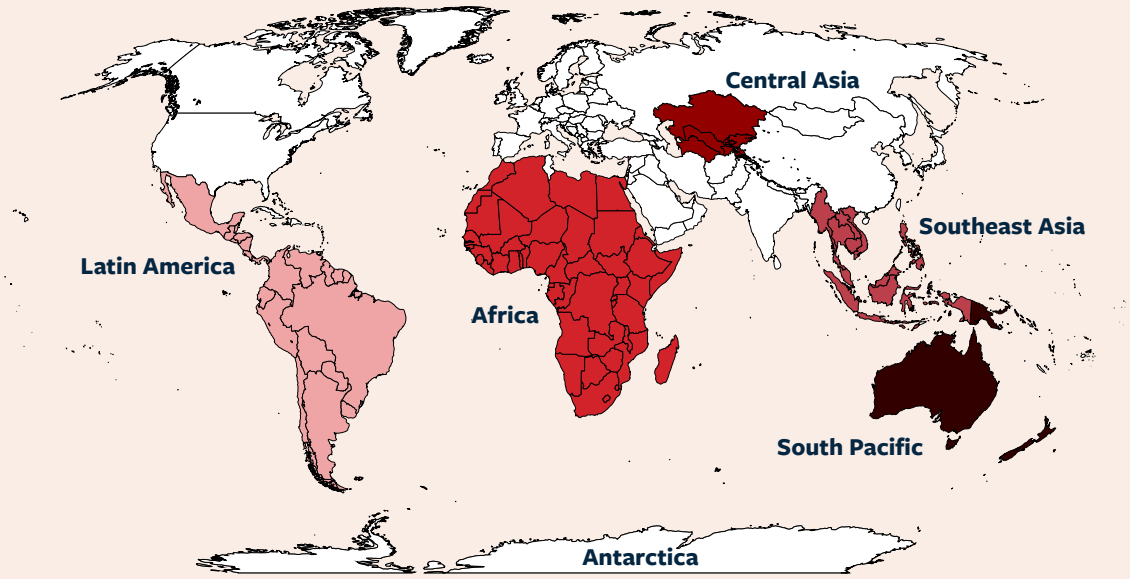
These regional initiatives, supported by greater use of verification technologies such as satellite imagery with the help of the IAEA[275] and remote sensing, could enhance compliance and foster greater trust among nations.[276] Moreover, regional cross-border security mechanisms that employ new technologies are crucial to ensure quick detection and an effective, coordinated response to emerging threats. For example, the use of drones equipped with sensors for chemical detection has been explored by several regional security initiatives, including the European Defence Agency, which aim to enhance the detection of CBRN threats in real-time and improve coordination among Member States. This initiative is part of the CBRN Reconnaissance and Surveillance System project, under the European Defence Industrial Development Programme.[277] The system includes drones and other unmanned vehicles that can detect and analyze hazardous substances in real-time, thereby improving the speed and effectiveness of response strategies among EU Member States.[278] The EU's CBRN Risk Mitigation Centres of Excellence Initiative is another key example of how regional organizations can enhance response capacities through training and the exchange of best practices.[279]

Capacity Development, Training, and Technological Advancements

The African Nuclear-Weapon-Free Zone Treaty, or Treaty of Pelindaba, has facilitated capacity development by providing training courses to African states.[280] In giving State Parties to the treaty experience in implementing its provisions, such intra-regional exchanges have fostered stability and security across the continent.[281] Current capacity-building efforts, such as the IAEA's technical cooperation programs, could be expanded to include virtual simulations and AI-driven analysis tools, providing officials with cutting-edge resources to counter WMD threats.[282] For example, the SLAFKA project demonstrates how blockchain technology can be used to securely track nuclear materials, enhancing the IAEA's ability to fulfill its mandate.[283]

Similarly, research by institutions like the Pacific Northwest National Laboratory (PNNL) and the University of New South Wales (UNSW) delves deeper into blockchain's potential to revolutionize nuclear safeguards. PNNL's studies highlight how distributed ledger technology can enhance data security and operational efficiency in managing nuclear safeguards.[284] Meanwhile, UNSW's research suggests that blockchain could play a critical role in ensuring the integrity and transparency of nuclear material data, offering a new layer of security for global nuclear non-proliferation efforts.[285]

Figure 3.4: Current Nuclear Weapon-Free Zones



Africa: Algeria, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Chad, Comoros, Congo, Cote d'Ivoire, Equatorial Guinea, Ethiopia, Gabon, Gambia, Ghana, Guinea-Bissau, Guinea, Kenya, Lesotho, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Nigeria, Rwanda, Sahrawi Arab Democratic Republic, Senegal, South Africa, Swaziland, Togo, Tunisia, Tanzania, Zambia, Zimbabwe

Central Asia: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan

Latin America: Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay, Venezuela

Southeast Asia: Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam

South Pacific: Australia, Cook Islands, Fiji, Kiribati, Nauru, New Zealand, Niue, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu

Source: United States Department of Defense, "Nuclear Treaties and Agreements," *Nuclear Matters Handbook 2020 (Revised)*, 142.

MINERALS FOR MILITARY TECHNOLOGIES

Uranium, rare earth elements, and critical raw minerals are essential for modern weapons and broader technological development. Uranium, a fundamental component of energy generation and nuclear weapons, contributes considerably to worldwide power production, particularly in EU Member States, and the United States.[286]

REEs, despite their relative abundance, are difficult to extract and treat.[287] They are vital in high-tech applications such as car catalysts, permanent magnets, batteries, and medical equipment. REEs are also essential components of jet fighter engines, missile systems, satellite communications, and other military applications.[288]

Meanwhile, critical raw minerals, such as lithium, cobalt, and platinum, are integral to economic development and national security, as they are largely employed in batteries and other high-tech military applications.[289] The military sector makes extensive use of these raw materials, most common of which are natural graphite and aluminum, in a variety of applications.[290] The unmanaged use of these critical raw materials and associated technologies, fueled by geopolitical conflicts and supply chain dependence, poses enormous hazards in the military and other high-risk domains.

Launch a Global Initiative for Fair and Transparent Military Mineral Practices

Strategic mineral management is vital to military technologies because rare earth elements and critical raw minerals are widely used in defense applications, such as missile guidance systems, military motors, mine detecting lasers, satellite communications, radar, sonar, and optical equipment.[291] Precision-guided weapons, electronic warfare equipment, and space technology also rely significantly on rare earth elements such as gadolinium, samarium, neodymium, and yttrium iron garnet.[292] Other critical minerals, such as iron, copper, and lithium, are required for military components and new energy technologies too,[293] whereas nickel and titanium are essential for jet turbine engines and hypersonic missiles.[294] Uranium's position in nuclear technology has important geopolitical ramifications, as superpowers modernize their arsenals and use depleted uranium warheads with armor-piercing capabilities.[295]

Designed as a comprehensive international framework for governments, multinational corporations, and other stakeholders, a Global Initiative for Fair and Transparent Military Mineral Practices ("MMPs Initiative") is urgently needed to promote transparency, environmental protection, and accountability in the management of mineral resources for military purposes.[296] Operating as a specialized entity inside the United Nations with active multistakeholder engagement, while drawing important lessons and insights from the Extractive Industries Transparency Initiative (EITI), the MMPs Initiative would facilitate implementation and monitor compliance of a global benchmark for transparency and accountability in the military-related mineral sector (operating, in essence, as a framework for disclosure and multistakeholder oversight).[297]

The EU Conflict Minerals Regulation, which follows from OECD recommendations,[298] also provides some useful precedents, including Nokia, for example, which has built a rigorous due diligence procedure to verify that its supply chains are devoid of conflict minerals.[299] However, given that it is adhered to only by the European Union's twenty-seven Member States, this regulatory framework is too narrow in reach to manage the intricacies of the global supply chain for military technology-related minerals.

Rather, the proposed MMPs Initiative could build on the EU's experience, while guaranteeing, on a global scale, the participation of all relevant countries and stakeholders. Strengthened reporting requirements and third-party audits (e.g., modeled on the UN Human Rights Council's Universal Periodic Review Mechanism, which facilitates rigorous human rights peer review and oversight on a regular basis) would enhance compliance and build confidence among the participating entities.[300] Such an approach would help

to reduce the geopolitical risks associated with military-related minerals, while encouraging sustainable and ethical mineral extraction and usage through more fair and transparent conditions worldwide.

Balance Extraction with Stability and Human Rights in Fragile States

Conflict over natural resources remains a significant driver of instability in fragile states. According to the *Fragile States Index 2024,* many of the most vulnerable countries—such as Sudan (2nd place), the Democratic Republic of the Congo (4th place), and the Central African Republic (7th place)[301]—are rich in valuable minerals and resources too. Extracting these resources frequently exacerbates rather than resolves long-festering conflicts.

The lack of efficient governance frameworks, rooted in principles of, for instance, responsibility, transparency, inclusion, and environmental protection, further allows foreign investors and private sector actors to dominate resource management choices, which frequently leads to exploitation and mismanagement.[302] This exploitation, in turn, exacerbates corruption, socioeconomic disparities, and environmental damage, destabilizing already fragile regimes.[303] Guinea, for example, contains 28 percent of all bauxite and alumina deposits. The Democratic Republic of the Congo holds 56 percent of the world's cobalt deposits. Notably, 100 percent of chromium and graphite deposits are located in countries deemed to be corrupt or extremely corrupt.[304]

Resource-rich economies tend to suffer more (compared to less resource-intensive economies) from higher levels of income inequality and corruption, larger shares of their population living in poverty, the prevalence of authoritarian regimes, higher defense spending as a share of the total budget, and a greater risk of armed conflict.[305] For example, the BRICS countries' growing demand for mineral and other natural resources across Africa have contributed to greater instability, corruption, and economic mismanagement on the continent, in part by allowing autocrats to resist democratic reforms.[306]

The Democratic Republic of the Congo is a valuable case study of the complicated dynamics of mineral exploitation in a fragile and poorly governed state. Despite the country's vast mineral resources, it is also one of the poorest and most conflict-affected places on earth. Many of its mining sites are controlled by illegal armed groups, which use their earnings to fund illicit activities against the state, including perpetuating conflict.[307]

In these delicate kinds of situations, foreign investors and private sector actors can perform both advantageous (positive) and disadvantageous (negative) roles. On one hand, they support international investment and commerce, thereby helping to translate a fragile country's abundant natural resources into sustained, national economic growth. On the other, their activities may have a deleterious impact on the environment and society.[308] For example, in Niger, local complaints and armed insurgencies like the Tuareg uprising were connected to the growth of uranium mining in the country, which has adversely affected mining operations and destabilized large areas of the country.[309] Similarly, in Sierra Leone, control over diamond mines has historically fueled civil conflict.[310]

Although Corporate Social Responsibility (CSR) initiatives are becoming more common, even in some of the poorest and most fragile places on the planet, their lack of effective legal structures and other capabilities to deliver on otherwise noble CSR principles have resulted in a limited impact in the communities these initiatives purport to serve.[311] Strengthening legal frameworks and other incentives

for aiding the successful implementation of CSR programs can assist in mitigating any potential negative environmental and societal impacts of foreign investment and private sector activities in resource-rich, yet fragile states. The introduction of practices and principles associated with the innovative notion of "responsibility chains" can also serve to lessen corruption and better guarantee that a country's natural riches benefit the general public, rather than a select few (box 3.1).

Box 3.1: Promoting Responsibility Chains (vs. Supply Chains) to Build Greater Stability and Prosperity in Fragile States

Due to intricate extraction procedures and geopolitical considerations, the global supply chains for key minerals and rare earth elements face numerous difficulties. Vulnerabilities have arisen as a result of Western countries' reliance on imported REEs, mostly sourced through China. With significant government assistance, China is the world's largest importer of rare earth compounds and oxides, accounting, for instance, for up to 94 percent of Myanmar's exports in this category. Given Myanmar's unstable regional environment, particularly in Kachin State, this has raised worries about the stability of the supply chain. Furthermore, China owns 60 percent of the world's capacity for lithium and graphite processing, in addition to 70 percent of the world's cobalt deposits in the Democratic Republic of the Congo.

Sourcing uranium in fragile states is another area fraught with geopolitical challenges, as China quickly scales-up its nuclear arsenal, while Russia solidifies its status as a major nuclear power. This change creates a more complicated three-power scenario out of the decades-old U.S.-Russia nuclear deterrence dynamic, which could fuel another arms race and complicate international security. Kazakhstan, the world's largest uranium producer, faces challenges in balancing exports, while maintaining a steady supply of uranium to multiple nations. Meanwhile, ongoing sanctions against Russian uranium have affected Western economies, which are dependent on Russia for components of the nuclear fuel cycle. This highlights the interdependence and weaknesses of current global supply systems.

An alternate strategy is offered by the notion of "responsibility chains," which emphasize human rights and socioenvironmental factors in commodity cycles. These networks integrate international organizations, non-governmental organizations, indigenous peoples, and production, extraction, and consumption, while simultaneously fostering leadership in the Global South (from countries where precious minerals are sourced). By strengthening certification programmes and law enforcement, including in fragile states, the innovative framework underpinning a responsibility chain seeks to reduce the hazards connected with "spoilers," avoid greenwashing, and encourage positive behavioral changes. Despite its known shortcomings, the Kimberley Process on conflict diamonds offers important lessons for carefully developing and implementing efficient responsibility chains, the basic policy of which must be one of "do not harm."

Developed countries have expanded their mining enterprises in less developed, yet resource-rich, countries, especially across Africa and South America, in an attempt to obtain key minerals.

Though climate change remains the chief existential global crisis of the present era, human rights must not be sacrificed in the name of shifting to renewable energy (for example, the specialized mineral requirements for electric batteries) and achieving net-zero carbon emission goals.

Numerous international mining corporations have pledged to uphold human rights by adhering to the guidelines established by the Universal Declaration of Human Rights and related frameworks. However, as accusations of human rights violations mount in important mining regions, such as Peru, Chile, and the Democratic Republic of the Congo, far more work is required to live up to the highest human rights standards. Here the transition from a traditional focus on supply chains globally to the adoption of innovative responsibility chains can make a difference.

Source: Original Box, Stimson Center. Data sources: Sadan et al, "Rare Earth Elements, Global Inequalities and the 'Just Transition'," 3; Bazilian, Holland, and Busby, "America's Military Depends on Minerals That China Controls," *Foreign Policy*; Sengupta, "Russia Power Plays: Deploys Military Might Over Africa's Critical Minerals," *Carbon Credits*; O'Rourke,"Renewed Great Power Competition: Implications for Defense—Issues for Congress," *Congressional Research Service 43838*, 21-23; Pistilli, "Top 10 uranium-producing countries," *Investing News Network*; Volobuyev, Milkin, and Stepanov, "Rosatom's net profit fell by 14%," *Vedomosti*; Groff, Folly, and Abdenur, *Responsibility Chains: Building Global Governance for Forest Risk Commodity Claims*, 4; The Kimberley Process, "What is the Kimberley Process?," accessed August 22, 2024; Boafo, et al, "The world is rushing to Africa to mine critical minerals like lithium – how the continent should deal with the demand," *The Conversation*; and Baskaran,"Why responsible mining is a human rights imperative," *Center for Strategic and International Studies*.

Bottlenecks and Spoilers

Today's Great Power tensions, especially over Ukraine and Taiwan, as well as Global North-South mistrust (think Gaza, as well as the failure to meet climate finance and wider development-aid targets) risk paralyzing the kinds of complex and sustained diplomatic negotiations required to seriously deliberate upon, let alone adopt, the kinds of far-reaching tech-governance principles and innovations in the peace and security space outlined above. Beyond the fraught international political environment and associated rivalries for influence and market advantage, other chief current and anticipated obstacles to improved governance of AI and other cybertech, weapons of mass destruction, and minerals for military technology are: i) ensuring adequate and sustained financing; ii) hiring effective leaders and general staff for overseeing and managing each new governance arrangement; iii) coping with the sometimes unstable domestic political conditions and high-levels of corruption in resource-rich countries; iv) dealing with multinational corporations and other private sector actors that may oppose governance changes, due to concerns about rising costs and lower profitability; and v) keeping pace with the always changing technological capacities a purported reform is designed to regulate in the hope of ensuring greater safety, security, and prosperity for all nations and peoples.

Admittedly, myriad impediments to progress—both real and potential—face the general principles and attempts to negotiate and adopt, let alone operationalize and fully implement, the ambitious and concrete reform proposals introduced in this section. Nevertheless, a generational opportunity has arisen with at least the potential to overcome some of these divides, with the back-to-back convening of the 2023 SDG Summit, 2024 Summit of the Future, and 2025 World Social Summit—a subject to which we now turn.

IV. From the SDG Summit and Summit of the Future to the World Social Summit & Beyond

> ***"Indeed, at the moment of Sputnik the planet became a global theater in which there are no spectators but only actors. On Spaceship Earth there are no passengers; everybody is a member of the crew. These facts do not present themselves as ideals but as immediate realities."***
>
> —Dr. Marshall McLuhan, Philosopher.[312]

In the wake of the COVID-19 crisis, last year's (September 18–19, 2023) Sustainable Development Goals (SDG) Summit in New York galvanized global attention around critical development goals at the half-way point to the deadline for achieving the 2030 Agenda for Sustainable Development. This year's (September 22–23, 2024) Summit of the Future (SOTF) will address global governance gaps identified in the SDG Summit Political Declaration by making the multilateral system more effective, networked, and inclusive.

Agreed to in a General Assembly resolution on July 16, 2024, the Second World Summit for Social Development is planned for November 4-6, 2025 in Doha. Building on the SDG Summit and Summit of the Future, the "World Social Summit" is anticipated to advance the United Nations' efforts to eradicate poverty, achieve full and productive employment and decent work for all, and promote social integration.[313]

This concluding section explores the multiple, potential "win-win" linkages between the SDG Summit, the Summit of the Future, and the World Social Summit; in many ways, their respective success depends on the identification and pursuit of the deep and varied connections between them. It further examines concrete entry points for the SDG, SOTF, and Social Summit action agendas through several tech-governance innovations in the spaces of global development and security (as introduced in sections two and three, respectively). The report concludes with some practical suggestions on seizing the moment and revitalizing global and regional problem-solving, drawing inspiration from the pivotal international cooperation principles of diplomacy, dialogue, and diversity.

From SDGs and Futures Thinking to the World Social Summit: Inclusive Governance Approaches and the "Through-line"

In addition to identifying twelve priority areas of action for the 21st century, the UN's 75th Anniversary (UN75) Political Declaration mandated the United Nations Secretary-General to produce a report before the end of the General Assembly's seventy-fifth session "with recommendations to advance our common agenda and to respond to current and future challenges."[314] With more than eighty far-reaching proposals, Mr. Guterres' *Our Common Agenda* report, released in September 2021, called for a series of UN summits that were subsequently endorsed by UN Member States.[315]

2022 witnessed the Transforming Education Summit, leading to the Secretary-General's Vision Statement;[316] 2023 saw the SDG Summit at the half-way point of the Agenda 2030 and adoption by Member States of the SDG Political Declaration;[317] in 2024, the Summit of the Future will produce the Pact for the Future and its annexed Declaration on Future Generations and Global Digital Compact; and in 2025, the World Social Summit will "adopt a concise, action-oriented political declaration."[318] On the UN calendar, these historic gatherings will be followed by the election of the next Secretary-General in 2026, another SDG Summit in September 2027, a Heads of State and Government Summit of the Future review in September 2028, and by 2029, only twelve months will remain to fully realize the SDGs.

> ***In addition to the cycle of negotiating modalities, revisions, and agreeing on actions, progress must be made through each of these summits and key moments year-on-year, thereby creating a virtuous, mutually-reinforcing, and ever-more ambitious set of high-level diplomatic gatherings. The stakes could not be higher and the road ahead more difficult and complex.***

In addition to the cycle of negotiating modalities, revisions, and *agreeing* on actions, progress must be made through each of these summits and key moments year-on-year, thereby creating a virtuous, mutually-reinforcing, and ever-more ambitious set of high-level diplomatic gatherings. The stakes could not be higher and the road ahead more difficult and complex. For starters, the *Global Sustainable Development Report 2023* produced ahead of that year's SDG Summit revealed sobering data on the lack of progress across the goals: only 17 percent of the SDGs were on course to be met by the end of the decade.[319]

The risk of not achieving the Sustainable Development Goals is further challenged by the potential crossing of critical and irreversible environmental (planetary boundary) tipping points.[320] At the same time, innovation at the technology frontier wields tremendous potential to either bring the international community back on track or cause devastating development breakdowns (see section two). It is worth, therefore, taking a short step back to assess the theory of change of recent years and known and potential ways the SDG Summit, the Summit of the Future, and the World Social Summit reinforce one another. To do this, it is helpful to first look at some sticking points and through-lines (figure 4.1).

Figure 4.1: From SDGs to UN75 to the Pact for the Future: What's "The Through-Line?"

SDGs

1. No Poverty
2. Zero Hunger
3. Good Health and Well-Being
4. Quality Education
5. Gender Equality
6. Clean Water and Sanitation
7. Affordable and Clean Energy
8. Decent Work and Economic Growth
9. Industry, Innovation and Infrastructure
10. Reduced Inequalities
11. Sustainable Cities and Communities
12. Responsible Consumption and Production
13. Climate Action
14. Life Below Water
15. Life On Land
16. Peace, Justice, and Strong Institutions
17. Partnerships for the Goals

Our Common Agenda

1. Human Rights; Universal Social Protection
2. Right to a Healthy Environment
3. New Agenda for Peace
4. Universal Access to the Internet as a Human Right
5. Gender Parity; Women's Economic Inclusion; Young Female Voices
6. Global Code of Conduct; Integrity; Inclusion; Anti-corruption
7. Global Digital Compact
8. High-Level Advisory Board; People-centered; Gender Parity
9. Biennial Summit for a Sustainable, Inclusive & Resilient Global Economy
10. Stronger UN Engagement With Regional Organizations and Civil Society Focal Points
11. UN Youth Office; Futures Lab; Declaration on Future Generations; UN Special Envoy for Future Generations
12. Emergency Platforms; Global Vaccination Plan; Universal Health Coverage

UN75 Declaration

1. Leave No One Behind
2. Protect Our Planet
3. Promote Peace & Prevent Conflicts
4. Abide by International Law & Ensure Justice
5. Place Women & Girls at the Center
6. Build Trust
7. Improve Digital Cooperation
8. Upgrade the UN
9. Ensure Sustainable Financing
10. Boost Partnerships
11. Listen to & Work With Youth
12. Be Prepared

HLAB: Six Shifts

1. Build Trust in Multilateralism
2. Planet & People
3. Global Finance
4. Digital & Data Governance
5. Peace & Prevention
6. Anticipatory Action

Pact for the Future: Rev 3

1. Sustainable Development and Financing for Development
2. International Peace and Security
3. Science, Technology and Innovation, and Digital Cooperation
4. Youth and Future Generations
5. Transforming Global Governance

What themes have been consistent?

- Financing for Sustainable Development
- Future-awareness
- Peace & Security
- Youth Empowerment & Inclusion
- Climate Change Mitigation & Adaptation
- Collective Governance
- Prevention
- United Nations Reform

Which topics have taken a back-seat?

- Democracy & Anti-Corruption
- Climate *Governance*
- Women & Girls (mentioned, but not center-stage)
- International Law

What's new?

- Role of Science, Technology, & Innovation for Peace, Security, Development, and Protecting the Environment
- Governing Outer Space
- Local & Traditional Knowledge Integration
- Measuring Progress (Beyond GDP)
- Global Governance Reform Beyond the UN
- Hard Security Focus (e.g. disarmament, non-proliferation—*in response to a harsher geopolitical climate?*)

Source: Original Figure, Stimson Center. Data sources: United Nations, *Sustainable Development Goals*; UNGA, *Declaration on the commemoration of the seventy-fifth anniversary of the United Nations*; Guterres, *Our Common Agenda*; HLAB on Effective Multilateralism, *A Breakthrough for Planet and People*; and UNGA, *Pact for the Future: Rev. 3*. Originally published in: Yusuf, Nudhara and Muznah Siddiqui. "Von >UN75< zum Zukunftsgipfel." *German Review on the United Nations*.

Since September 2015, with the adoption of the seventeen Sustainable Development Goals, technology, especially digital technology, has assumed a forward-leaning role on the global agenda. Issues such as peace and security, finance, and future-awareness have been featured consistently, although addressed in different ways over the past decade. For example, while the SDGs themselves are built on the principle of sustainable development, which the Brundtland Commission identifies as "development without harming future generations,"[321] it has taken some nine years after the advent of the 2030 Agenda for a Declaration on Future Generations, in 2015, to negotiate and set down parameters of what we mean by and owe to "future generations."[322]

Each of the three summits—the SDG Summit, Summit of the Future, and World Social Summit—play important, mutually reinforcing, and complementary roles in moving global multilateral agendas forward in their preparation, convening, and concrete outcomes. The SDG Summit recognised the need for policy accelerators (policies that progress on more than one Sustainable Development Goal at once) to help push the Agenda 2030 forward. For example, not only did the summit convene a plethora of actors working on the SDGs at various levels to enable knowledge-sharing and learning, paragraph 38(t[iv]) of the SDG Political Declaration called for an SDG Stimulus to unlock financing for sustainable development.[323]

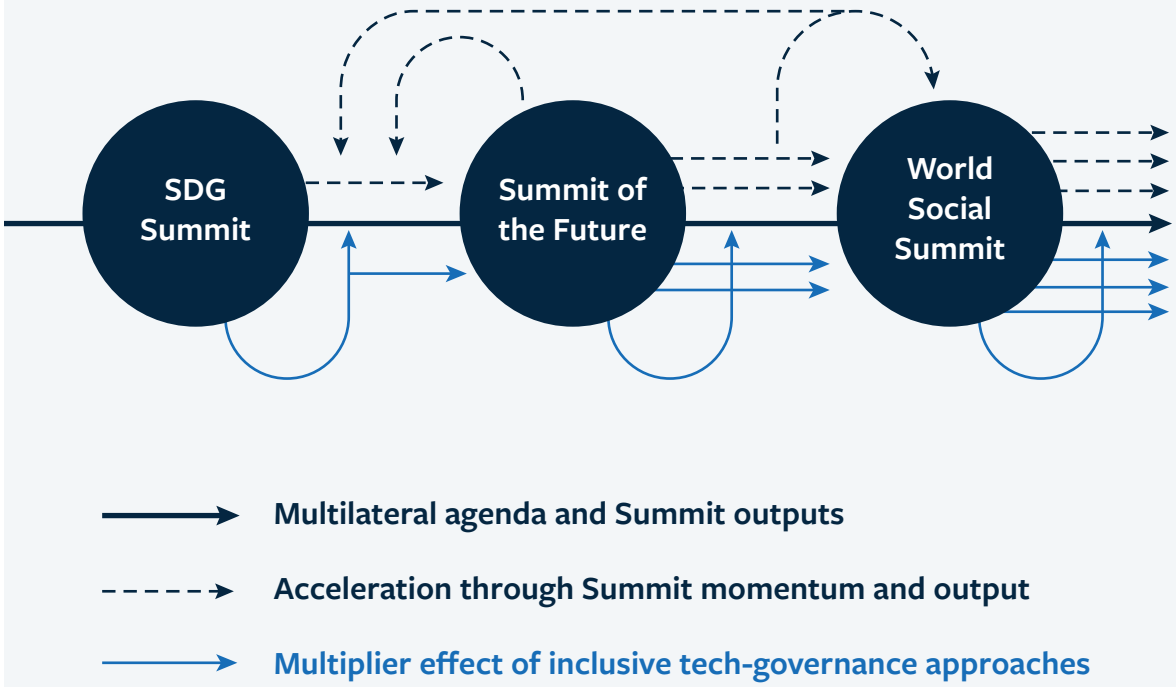
Building on the SDG Summit's progress, the Summit of the Future extends out the multilateral toolkit to enable the international community to achieve these accelerators. It has, for example, engendered a rethink of the global financial architecture to enable such a stimulus and support its effective use, as part of the Pact for the Future's 60 adopted actions.[324] More specifically, Chapter 1 and especially 5 of the Pact for the Future propose technical institutional reforms to foster better financing for development.[325]

> ***Together, these three summits push us closer toward achieving global agendas from the SDGs, to Paris, to Addis Ababa, and beyond. They serve as the "what do we do," "what do we do it with," and the "how do we do it" instruction manual for global governance.***

Finally, the World Social Summit brings us back to impact and implementation. The General Assembly's modalities resolution has proposed a roundtable on strengthening the three pillars of social development, namely: i) poverty eradication, ii) employment and decent work, and iii) social inclusion; as well as a roundtable on addressing gaps and challenges from the 1995 Copenhagen Declaration on Social Development and its Program of Action.[326] Together, these three summits push us closer toward achieving global agendas from the SDGs, to Paris, to Addis Ababa, and beyond. They serve as the "what do we do," "what do we do it with," and the "how do we do it" instruction manual for global governance. Together, they must be utilized fully and strategically for making steady progress, including by employing innovations—including technological ones—that put UN Member States on the right course toward generating positive (rather than negative) multiplier effects.

What is clear is that this has been an inductive process of change, not just for the UN but for multilateralism more broadly, of trying to visualize what a 21st century form of global governance looks like. It is helpful, therefore, to think of the consecutive, annually-timed summits as acceleration points for uncovering various pieces of the puzzle (figure 4.2). This framing also gives due importance to the moments in between the summits where the actual "driving" and hard-fought focus on implementation of a newly adopted action agenda ought to happen.

Figure 4.2: Acceleration and Multiplier Effects From the SDG Summit to the World Social Summit



Source: Original Figure, Stimson Center.

A critical question then is, who does this driving? Another "through-line" from the SDGs till date has been the importance of collective governance. The SDGs called this *Goal 17 on Partnerships for the Goals, Our Common Agenda* further developed a model of networked and inclusive multilateralism, the High-Level Advisory Board addressed it in "Shift One" on building trust in multilateralism, and the Summit of the Future's preparations witnessed both frequent stakeholder consultations and the May 2024 UN Civil Society Conference in Support of the Summit of the Future, which initiated some twenty multistakeholder ImPact Coalitions.[327]

Still, emphasis must be placed on strengthening and building multistakeholder approaches to governance between the summits, especially as we head toward the 2025 World Social Summit. This is crucial for both implementation of governance around new technologies with cross-sectoral spillover effects, but also to harness innovation outside the public sphere and align with shared global goals. The following illustrates how recommendations in section two and three of this report help build inclusive approaches to governance as a critical through-line in the theory of change so central to the success of the three-part SDG Summit, Summit of the Future, and World Social Summit series.

Section two of this report considered three key entry points for employing inclusive tech-governance as an accelerator for global development. In increasing multistakeholder cooperation, not only are more resources pooled collectively, but accountability is better ensured for remaining on the right side of the technological multiplier effect, as a key through-line and shared outcome of the SDG Summit, Summit of the Future, and World Social Summit.

Assemble an Independent International Scientific Panel on AI and Frontier AI Collaborative. As proposed in the Summit of the Future's Global Digital Compact and built out in this report, establishing an Independent International Scientific Panel on Artificial Intelligence as a key driver of Summit of the Future outcomes for digital governance would utilize expertise across major stakeholder groups to inform a more policy-oriented mechanism (like the proposed International Artificial Intelligence Agency, as detailed in section three and referenced below too) with expert-level knowledge to govern better at the AI frontier.[328] A new community of practice through an Frontier AI Collaborative would further support policy platforms with a new international public-private partnership for expanding access to or funding innovation in AI technology from leading private sector AI developers, where much of the innovation happens outside the public realm.

Strengthen the UNFCCC's Climate Technology Center & Network to Promote Global Greentech Innovation, Research, and Capacity-Building. The Climate Technology Center & Network merits strengthening by: i) expanding the center and network's authorities beyond technical assistance; ii) developing regional hubs of innovation and excellence; iii) establishing educational exchange and training programs; and iv) shifting the focus from providing technical assistance to establishing robust partnerships. This would, in effect, leverage capacity, experience, and expertise beyond the UN system, in order to focus on greentech transfers and setting up hubs that can advance follow-through to both the SDG Summit (including for Goals 13 on Climate Action, 14 on Life Below Water, and 15 on Life on Land) and the World Social Summit.

Enable Biotech Capacity by Expanding Technical Transfers in the WHO Pandemic Agreement. The recent pandemic has shown that while specific international responses were helpful (albeit delayed at times), possessing the broader capacity to deal with unrelated public health challenges that arise from shocks on the global health system are paramount too. Transfer of biotech capacity must be viewed beyond the narrow lens of which Intellectual Property Rights (IPR) should be transferred. In preparing for future pandemics, the World Health Organization Pandemic Agreement's Intergovernmental Negotiating Body should further heed the Independent Panel for Pandemic Preparedness and Response's concern, which shed light on how vaccine procurement and distribution during the COVID-19 pandemic was severely constrained by the World Trade Organization's strict IPR protection regime for generic pharmaceuticals, backed by powerful World Trade Organization Member States.[329]

These proposed reforms are not only needed to progress on Sustainable Development Goal 3 for Good Health and Well-being, but they also build critical capacity for when, for example, an emergency platforms protocol (as called for in the Pact for the Future in Action 57) is triggered to address a future acute global shock, such as another pandemic.[330]

SEC TECH

GOVERNING TECHNOLOGY FOR GLOBAL PEACE AND SECURITY

A fundamental driver of peace is development, while peace and security are essential for development and the safeguarding of basic human rights. The Summit of the Future further recognizes the significant implications of new and emerging technologies for international peace and security.[331] Section three of this report considered, in particular, three entry points for improving inclusive tech-governance in the peace and security space, reinforcing the overarching goals and common through-line of the SDG Summit, Summit of the Future, and World Social Summit.

Create an International Artificial Intelligence Agency (IA2). Among the IA2's proposed core functions in support of better AI global governance are: i) improving visibility, advocacy, and resource mobilization for global AI regulatory efforts, capacity-building, and expanded access; ii) monitor, evaluate, and report on AI industry safeguards and AI compute, including through establishing an AI Chip Registry; and iii) coordinate transnationally across initiatives and frameworks on AI governance to support knowledge-sharing of best practices and lessons learned.

With technology referenced in twenty-five of the SDGs targets and the growing prevalence of artificial intelligence,[332] the IA2 would serve to accelerate progress on many of the SDGs, including, for instance, Goal 16's target 16.10 on ensuring public access to information to, in part, help prevent violence and combat terrorism and crime.[333] The recommended International Artificial Intelligence Agency is also poised to take forward the principles and commitments introduced in the Global Digital Compact's "Objective 5. Enhance international governance of artificial intelligence for the benefit of humanity."[334]

Enhance WMD Regional Tech-Governance and Develop Capacity for Innovation and Safety. The African Nuclear-Weapon-Free Zone Treaty has facilitated capacity development by providing training courses to African states.[335] In giving State Parties to the treaty experience in implementing its provisions, such intra-regional exchanges have fostered stability and security across the continent.[336] Current capacity-building efforts, such as the International Atomic Energy Agency's (IAEA) technical cooperation programs, could be expanded to include virtual simulations and AI-driven analysis tools, providing officials with cutting-edge resources to counter weapons of mass destruction threats.[337] For example, the SLAFKA project demonstrates how blockchain technology can be used to securely track nuclear materials, enhancing the IAEA's ability to fulfill its mandate.[338]

The recommended associated activities from section three of this report each serve to advance the Pact for the Future's "Action 26. We will steadfastly advance our efforts to achieve the goal of a world free of nuclear weapons" and associated commitments outlined in paragraphs 47 (a)-(f).[339]

Balance Extraction with Stability and Human Rights in Fragile States. Conflict over natural resources remains a significant driver of instability in fragile states. Strengthening legal frameworks and other incentives for aiding the successful implementation of Corporate Social Responsibility programs can assist in mitigating any potential negative environmental and societal impacts of foreign investment and private sector activities in resource-rich, yet fragile states. The introduction of practices and principles associated with the innovative notion of "responsibility chains" can also serve to lessen corruption and better guarantee that a country's natural riches benefit the general public, rather than a select few.

Together, these actions can serve to advance several of the defined Sustainable Development Goal 16 targets, such as 16.4 (dealing with the recovery of stolen assets) and 16.5 (on substantially reducing

corruption and bribery).[340] They are also poised to contribute meaningfully in fragile states to the World Social Summit's focus on eradicating poverty, achieving full and productive employment and decent work for all, and promoting social integration.[341]

Across all of these accelerators and drivers of change (often in the form of novel public-private partnerships), common inclusive approaches can increase accountability and progress toward achieving our global agendas and push the international community away from a global breakdown scenario. In other words, we ought to be less concerned about the level of ambition achieved at the summit and more concerned with how the outcomes are operationalized and institutionalized in ways that push progress forward at the frontiers to achieve a collective "global breakthrough" scenario.

The Way Forward: Diplomacy, Dialogue, and Diversity

Under the banner of "Diplomacy, Dialogue, and Diversity," the Doha Forum has, for over two decades, promoted a spirited and open interchange of ideas to innovate and improve international policy-making through action-oriented networks. Informed by this *Future of International Cooperation 2024* report on "The Innovation Imperative: Tech-Governance, Development & Security at a Crossroads," this year's Doha Forum (December 7-8, 2024) will further explore ways to fully leverage the generational opportunities provided by the convening and follow-through of the back-to-back, closely intertwined 2023 SDG Summit, 2024 Summit of the Future, and 2025 World Social Summit. In doing so, the Doha Forum seeks to encourage creative thinking and empirically grounded debate on revitalizing global and regional problem-solving, drawing inspiration from the pivotal international cooperation principles of diplomacy, dialogue, and diversity, in support of diverse coalitions of global, results-oriented state and non-state actors.

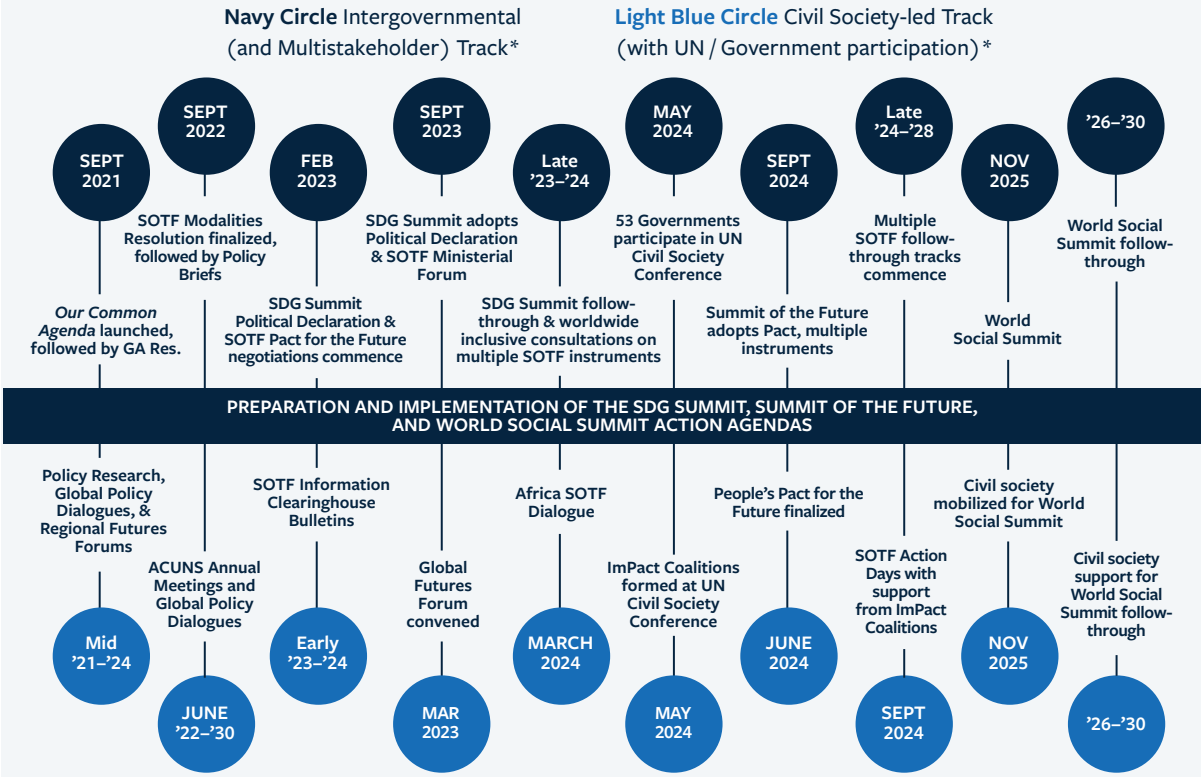
> ***Just as the Summit of the Future has proven adept at addressing the major global economic and financial architecture gaps identified in the SDG Political Declaration, both preceding (2023 and 2024) summits are poised to generate momentum, tools, and financial resources for advancing the World Social Summit's focus on eradicating poverty, achieving full and productive employment and decent work for all, and promoting social integration.***

In this regard, figure 4.3 offers some concluding guidance for governments (top row, including representatives from international organizations) to consider—these next twelve months and beyond—alongside suggestions for civil society (bottom row, including representatives from religious organizations, the media, and business community) to maximize SDG Summit and Summit of the Future follow-through and the closely attendant preparations for next year's World Social Summit. Just as the Summit of the Future has proven adept at addressing the major global economic and financial architecture gaps identified in the SDG Political Declaration, both preceding (2023 and 2024) summits are poised to generate momentum, tools, and financial resources for advancing the World Social Summit's focus on eradicating poverty, achieving full and productive employment and decent work for all, and promoting social integration.

In concrete terms, the Summit of the Future's chief outcome, the Pact for the Future, mentions financing for development and SDGs financing some twenty-five times, and its culminating chapter five alone

on "Transforming global governance" dedicates six detailed Actions (#'s 48-53) to specific kinds of international financial architecture reform and strengthening.[342] By offering conceptual and analytical clarity, high-level political support, financial and technical assistance, and path-breaking governance innovation proposals, the SOTF Summit is complementary toward and mutually reinforcing on several levels with the SDG Summit;[343] both can now play similar roles too vis-à-vis the preparations for the 2025 World Social Summit in Doha.

Figure 4.3: SDG Summit and Summit of the Future Follow-through & Roadmap to the World Social Summit



* Only select recommended activities listed. Source: Original Figure, Stimson Center.

Growing disruptions within and across borders in today's fast-changing world are creating new challenges, risks, and opportunities for development, security, the climate, human rights, and the global order itself. With courage, foresight, and creativity, including in the skillful application of new tools and approaches to collective tech-governance, global, regional, national, and community-based leaders can equip their citizens not only to cope with disruptive global forces, but to thrive in today's hyperconnected world economy. This report aims to support Doha Forum participants, policy-makers, and informed citizens worldwide in charting that course. Embracing the Innovation Imperative has become our generation's moral and practical imperative for achieving a safer, more just, and more prosperous future for all.

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Annex: List of Relevant Resources

Reports and Books

- *Confronting the Crisis of Global Governance* (*June 2015*)
- *Just Security in an Undergoverned World* (*Oxford University Press, 2018*)
- *An Innovation Agenda for UN75: The Albright-Gambari Commission Report and the Road to 2020* (*June 2019*)
- *Reimagining Governance in a Multipolar World* (*co-published by the Doha Forum and Stimson Center, September 2019*)
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- *Fulfilling the UN75 Declaration's Promise: An Expert Series' Synthesis of Major Insights and Recommendations* (*June 2021*)
- *Beyond UN75: A Roadmap for Inclusive, Networked & Effective Global Governance* (*June 2021*)
- *Building Back Together and Greener: Twenty Initiatives for a Just, Healthy and Sustainable Global Recovery* (*co-published by the Doha Forum and Stimson Center, September 2021*)
- *Road to 2023: Our Common Agenda and the Pact for the Future* (*June 2022*)
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- *Interim People's Pact for the Future: 2023 Civil Society Perspectives on the Summit of the Future* (*published by the Coalition for the UN We Need, March 2023*)
- *Global Governance Survey 2023: Finding Consensus in a Divided World* (*June 2023*)
- *Global Governance Innovation Report 2023: Redefining Approaches to Peace, Security & Humanitarian Action* (*June 2023*)
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- *2023 Report of the Climate Governance Commission: Governing Our Planetary Emergency* (*Climate Governance Commission, November 2023*)
- *Global Governance Innovation Report 2024: Advancing Human Security through a New Global Economic Governance Architecture* (*June 2024*)

Latest Action Plans from the Global Policy Dialogues Series

- *Roadmap for the Future We Want & UN We Need: A Vision 20/20 for UN75 & Beyond* (*UN75 Global Governance Forum, September 2020*)
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- *Global Policy Dialogue on Advancing Human Security through a New Global Economic Governance Architecture* (*Tokyo, Japan, as part of the 2024 ACUNS Annual Meeting*)

Global Governance Innovation Network Latest Policy Briefs

- *Responsibility Chains—Building Global Governance for Forest Risk Commodity Chains* (*August 2022*)
- *Bolstering Arms Control in a Contested Geopolitical Environment* (*November 2022*)
- *Enhancing Preventative Measure for Money Laundering and Corruption* (*April 2024*)
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Future of International Cooperation Report 2024

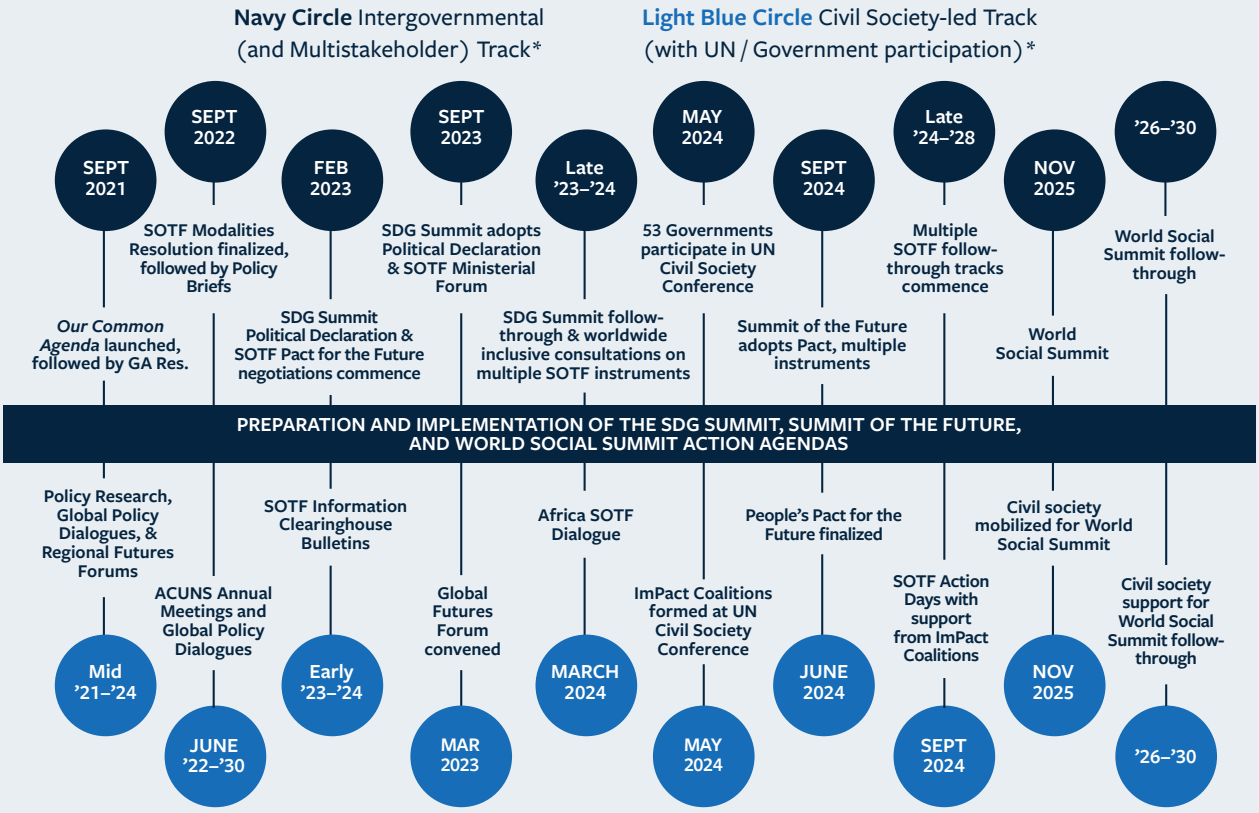
The Innovation Imperative: Tech-Governance, Development & Security at a Crossroads

"...When nations innovate together, their citizens are better equipped to harness the potential benefits of technology and live in ever more interconnected ways..."

—Foreword to FIC'24
Mubarak Al-Kuwari, Brian Finlay, and Mohamed Chihi

What new institutions and practices—engaging government as well as civil society, religious, and business leaders—are required to keep pace with and to harness technology's full potential for the benefit of humanity? This second edition of the *Future of International Cooperation* (FIC'24) focuses on how technology and its governance can best advance and safeguard fundamental global development and security goals, including the 2030 Agenda for Sustainable Development and the quest for sustainable peace. With a fresh analytical lens and foundational principles for effective global and regional approaches to tech-governance, the report assesses both the risks and promise of tech-governance innovations for global development in the AI/cybertech, biotech, and greentech spaces, and for global peace and security in the domains of AI/cybertech, weapons of mass destruction, and essential minerals supply chains for advanced military and civilian technologies. By offering novel ways to manage and employ technology as a force for good, FIC'24 identifies entry points for deepening the multiple, mutually reinforcing ways this year's Summit of the Future has positively influenced last year's SDG Summit and will likely shape next year's World Social Summit in Doha.

Figure 4.3: SDG Summit and Summit of the Future Follow-through & Roadmap to the World Social Summit



* Only select recommended activities listed. Source: Original Figure, Stimson Center.

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